Journal of the Kansas Entomological Society

Vol. 22 January, 1949 Number 1

PUBLICATION COMMITTEE

PAUL B. LAWSON, Editor, Lawrence
R. H. BEAMER, Lawrence R. H. PAINTER, Manhattan
DWIGHT ISELY, Fayetteville, Ark.

JAMES WALKER McCOLLOCH
1889-1929

Entered as second-class matter June 7, 1939 at the Post Office at Manhattan, Kansas, under the Act of August 24, 1912.

JOURNAL OF THE KANSAS ENTOMOLOGICAL SOCIETY

A quarterly journal published in January, April, July, and October devoted to Entomology in the Western Mississippi Basin and the proceedings of the Kansas Entomological Society.

Manuscripts for publication may be sent to any of the publication committee.

The Kansas Entomological Society does not make exchanges since the Society does not maintain a library.

Subscriptions to the Journal must be paid in advance. The subscription rate is so low that second notices are not ordinarily sent out.

Payment of Canadian or other foreign subscriptions and bills must be made by international Postal Money Order or by a draft on a New York bank and payable in U.S.A. dollars.

Subscribers are urged to give us their full cooperation in these matters.

Subscriptions should be sent to Donald A. Wilbur, Department of Entomology, Kansas State College, Manhattan, Kansas.

Subscriptions in the U.S.A.,	**$2.00 per year**	**Single Copy**
Canadian or foreign subscriptions,	**2.25 per year**	**75 cents**

KANSAS ENTOMOLOGICAL SOCIETY

President, Fred D. Butcher
Vice-President, Leon W. Hepner
Secretary-Treasurer, Donald A. Wilbur
Editor, P. B. Lawson

Vol. 22, No. 1, January, 1949

This issue mailed March 7, 1949

long
fine
lecti
distr
V
for
liter
real
char
relie
Man
rectl
char
mina
the
been
1928
genu
The
temp
It
capsu
this
genit
to b
A
Fran
Kans
colle
O
to m
been

*Cont
[1] 1919.

[2] 1928.

Kansas Entomological Society
Vol. 22 January, 1949 Number 1

A STUDY OF THE GENUS MARTAREGA (HEMIPTERA, NOTONECTIDAE)

FRED S. TRUXAL*

INTRODUCTION

The genus Martarega is one of eight genera of Hemipterous insects belonging to the family Notonectidae. It has a limited distribution being confined to Central and South America and Mexico. The small amount of collecting in this group is undoubtedly one reason for its recorded limited distribution.

Very little work has been done on this genus. This is especially true for the last two decades. There has been much confusion throughout the literature as to various structural characteristics. Not until 1928 was any real progress made in describing specimens by consistent morphological characters.[1] The earlier workers in describing members of this genus relied almost entirely upon color pattern and variable structural characters. Many good species have been overlooked and many more have been incorrectly identified. With the confusion that resulted from the use of such characters, the need became apparent for a more accurate means of determination. In 1919 it was found by Hungerford[1] that the genital armature of the male was of taxonomic value in the family Notonectidae. Much use has been made of this information. For this genus, the work by Jaczewski[2] in 1928 is most noteworthy. In that year he made the first general study of the genus **Martarega,** which appeared in the "Annales Musei Zoologica Polonici." The work now in progress by the writer makes the second such study attempted for the genus.

It was suggested by Doctor H. B. Hungerford that the male genital capsule might prove of real value in describing species of this genus. In this paper I have redescribed the members of the genus, using the male genital capsule and specific external morphological characters which appear to be consistent.

A great majority of the material which I have studied is located in the Francis Huntington Snow Entomological Collections at the University of Kansas. I also have material from various other museums and personal collections for which I am deeply grateful.

Of the eleven species herein described, all have been made available to me. Only in one case, that of the male **M. mcateei,** has my description been based on the original. In this case the types were destroyed in World

*Contribution from the Department of Entomology, University of Kansas.

[1] 1919. Hungerford, H. B., The Male Genital Capsule as a character of specific value in certain Cryptocerata (Hemiptera—Heteroptera), Bulletin of the University of Kansas, Vol. XXI, pp. 329-331.

[2] 1928. Jaczewski, T., Annales Musei Zoologica Polonici, Vol. VII, pp. 131-135.

War II. The one female of this species that I have for study is a paratype that came from the author's collection.

FAMILY CHARACTERISTICS

The family Notonectidae, to which this genus belongs is composed of truly aquatic forms differing from all other such insects, except Pleidae and Helotrephidae, in the habit of swimming on their backs. They are deep-bodied, flat ventrally, and convex dorsally. The eyes are large, reniform, and twice sinuate. Ocelli are absent in this family. The antennae, which usually are hidden from above, consist of three or four segments, and arise on the latero-ventral surface of the head. The beak is four-segmented. The hind pair of legs are more or less flattened and heavily fringed for swimming, while the front and middle pairs are adapted for grasping. The tarsi are two or three segmented. The tarsi possess two apical claws which are prominent except in the case of the hind legs where they are greatly reduced and inconspicuous. The pronotum is transverse, slightly convex, and usually narrower in front than behind. The abdomen possesses a prominent longitudinal mid-ventral keel, having hairs at least along its lateral margins. Together with the hairs along the sides of the venter, they cover the two longitudinal troughs forming air chambers.

KEY TO THE GENERA OF NOTONECTIDAE[3]

(As given by Hungerford)

The family Notonectidae consists of eight genera which may be classified by the following key:

A. Hemelytral commissure without a definite hair-lined pit at the anterior end ..... (Subf. Notonectinae)
  B. Intermediate femur with anteapical pointed protuberance, and antennae four-segmented ..... (Tribe Notonectini)
    C. Anterolateral margins of prothorax not foveate ..... **Notonecta**
    CC. Anterolateral margins of prothorax foveate ..... **Enithares**
  BB. Intermediate femur without anteapical pointed protuberance.
    C. Intermediate tarsus with two well developed segments and a very small basal one. Sides of prothorax foveate. Infracoxal plates bare but margined with hair ..... **Paranychia**
    CC. Intermediate tarsus with one well developed segment. Sides of prothorax foveate. Infracoxal plates covered with hair.
      D. Antennae 3-segmented ..... **Nychia**
      DD. Antennae 4-segmented ..... **Martarega**
AA. Hemelytral commissure with definite hair-lined pit at anterior end ..... (Subf. Anisopinae)

[3] 1946. Hungerford, H. B., A new Genus and Species of the Family Notonectidae, Journal of the Kansas Entomological Society, Vol. XIX, pp. 59-61.

B. Ventral abdominal keel not extending onto last abdominal segment. Male genital capsule cleft behind Males without stridular protuberance on front tibia. Females with short gonapophyses. ..... **Paranisops**

BB. Ventral abdominal keel extending onto last abdominal segment. Male genital capsule closed behind. Males with stridular protuberance on front tibia. Females with long subspatulate gonapophyses.

C. Male with anterior tarsus 1-segmented..... **Anisops**

CC. Male with anterior tarsus 2-segmented..... **Buenoa**

The above key begins with the most primitive genus of the family and progresses to the most highly specialized. No linear arrangement, however, is consistent in all regards. The best one can do is to use the fundamental differences and allow for parallel and independent modification.

Genus Martarega White

1879. **Martarega**, White, F. B., Transactions of the Entomological Society of London, 3rd Series, Vol. XVII, p. 271.
1883. **Signoretiella**, Berg, C., Anales de la Sociedad cientifica Argentina, Vol. XVI, p. 122.
1884. **Signoretiella**, Berg, C., Hemiptera Argentina, Addenda et Amendanda, p. 121.
1897. **Martarega & Signoretiella**, Kirkaldy, G. W., Transactions of the Entomological Society of London, pp. 394-426.
1899. **Martarega**, Kirkaldy, G. W., Bollettino dei Musei di Torino., Vol. XIV, p. 9. (Gives **Signoretiella** Berg as synonym).
1904. **Martarega**, Kirkaldy, G. W., Wiener Entomologische Zeitung, Vol. XXIII, p. 126.
1909. **Martarega**, Kirkaldy, G. W. and Torre-Bueno, J. R. de la, Catalogue in The Proceedings of the Entomological Society of Washington, Vol. X, p. 201.
1919. **Martarega**, Hungerford, H. B., University of Kansas Science Bulletin, Vol. XI, p. 165. (Notes on biology of Notonectidae).
1924. **Martarega**, Hale, H. M., Proceedings of the Linnean Society of New South Wales, Vol. XLIX, pp. 462-463.
1928. **Martarega**, Jaczewski, T., Annales Musei Zoologica Polonici, Vol. VII, pp. 131-135.
1933. **Martarega**, Hungerford, H. B., University of Kansas Science Bulletin, Vol. XXI, pp. 9, 10, 12, 22. (Key and notes on genera of Notonectidae).
1946. **Martarega**, Hungerford, H. B., Journal of the Kansas Entomological Society, Vol. XIX, p. 61. (Revised Key to Notonectidae).

As seen from above, body is long, cylindrical, and more or less conical in shape. Widest portion of body at point mid-way of longitudinal axis. Head rounded anteriorly and strongly connected to thorax. Posterior margins of eyes invade pronotum; inner margins converge posteriorly to form ocular commissure. Vertex small and triangular; anterior margin convex and less than its median length. Antennae four-segmented; basal segment very short and inconspicuous; second segment long, stout, and cylindrical; third segment cylindrical, approximately as long as second, and armed with spatulate hairs; fourth segment small and weakly formed. Labrum sharply triangular with apex extending onto second segment of rostrum. Rostrum four-segmented; first two segments short and wide; third and fourth segments long and narrow. Pronotum trapezoidal in shape and approximately three times as broad as long. Anterior margin of pronotum invaded by posterior margins of eyes. Posterior margin of pronotum slightly concave; lateral margins slightly divergent. Antero-lateral angles of pronotum foveate. Scutellum small and triangular; its base wider than its median length. Hemelytra not distinctly divided into clavus and corium. Mem-

brane much reduced, not distinctly separated from rest of hemelytron. Hemelytral suture long with each hemelytron terminated by long, slender, triangular process. Mid-ventral keel entirely covered with hair or with hair present on lateral margins only.

The genus is composed of both brachypterous and macropterous specimens, the former far outnumbering the latter in all collections examined. There are several differences to be noted between these two forms; the most outstanding of which is the complete lack of flight wings in brachypterous forms. Hemelytra of macropterous specimens are distinctly divided into corium, clavus, and membrane; the latter being bilobed. Markings on the hemelytra are different in the two forms. Hemelytra of brachypterous specimens are generally hyaline with opaque markings present. Hemelytra of macropterous specimens are completely opaque except for very narrow hyaline stripes. In some species, macropterous specimens possess hemelytra that are brown to black while those of its brachypterous forms are testaceous. The pronotum and scutellum are more feebly developed in brachypterous forms than in macropterous ones; the pronotum being less widened posteriorly and shorter, and scutellum smaller. The head in both forms is so strongly connected to the prothorax that it is almost impossible to separate the two.

Male genital capsule composed of ninth abdominal segment; resembles in general shape that of **Notonecta** L. Its tergite narrow and bridge-like and sternite strongly developed, boat-like in shape with angular protuberance at lower side before the end and with apical fissure through which penis can project; sternite is pilose. Genital claspers asymmetrical; left larger than right. Posterior lobes of capsule slightly asymmetrical; right slightly smaller than left. The shape of the claspers, especially that of the left, is of taxonomic value. The penis is made up of a basal pedicle, a thick middle portion with a long, narrow, and curved process, and a terminal tube-like part. I think the penis could be of taxonomic value if studied further.

The legs are variously marked in this genus. Some show longitudinal brown and black stripes and basal portions, while other specimens show no dark markings at all. Color markings of the legs do not seem to be consistent. Front tarsi of males two-segmented; front tarsi of females one-segmented. Intermediate tarsi one-segmented in both sexes; hind tarsi two-segmented in both.

Secondary sexual characteristics, other than the front tarsal segments, are to be noted in **Martarega**. The face when seen from the side appears to be distinctly flattened in the male while rounded in female. The female in general body form is more robust with wider and longer body and appendage dimensions than the male.

BIOLOGY

The biology of **Martarega** is little known. To my knowledge not a single life history of a species has been published. It may be assumed, however, that the relation of **Martarega** to other aquatic life is similar to that of

Notonecta or other members of the subfamily Notonectinae. The biology will be known only upon investigation and study of the insects in their native haunts.

TECHNIQUE

To understand the descriptions and keys given in this paper, it is important to point out certain techniques that this writer has used.

The measurements of the body have been made from above the dorsal side of the insect when held in a horizontal position with the transverse and longitudinal axis exactly horizontal. The length of the specimen was measured along the median longitudinal axis from the anterior tip of the head to the posterior margin of the hemelytra. The width of the pronotum was measured along the posterior or widest margin.

The various measurements and dissections on the specimens were made possible by first immersing the insect in a five percent alcohol solution to relax it. To dissect out the male genital capsule, after having relaxed it, the specimen is held between thumb and finger of one hand and with the other, by means of a "minuten" needle bent at the tip, the lateral articulations of the capsule with the wall are broken, and the capsule is drawn out. The features of the dark sclerotized capsule cannot be observed accurately without clearing. To clear the capsule, it is placed in cold ten percent KOH solution for a few hours. After washing in distilled water it is then placed in a drop of glycerine on a hollow-ground glass slide for study. With a coverslip over the capsule, it is held in place and may be readily examined and drawn. There are many other methods to accomplish the same results but the writer found the above procedure to be simple, time-saving, and perfectly successful.

Drawings of both sides of the asymmetrical capsules have been made so that the worker will have less difficulty in comparing specimens.

TAXONOMY

The study of this genus was handicapped by the small amount of work previously done on the group. Earlier workers used characters which were considered satisfactory at that time but today's modern, more accurate, and technical equipment proves them unstable.

Color and hemelytral patterns which constituted a great majority of the former specific descriptions were found to be too variable to be of much taxonomic value. The genus may, however, be safely divided into four groups by use of the patterns on the hemelytra.

Size alone is not of specific value, except when used in conjunction with other characters.

External morphological characters which this writer finds to be of taxonomic use are several in number. The sculpturing and armature of the mesotrochanter, the sculpturing of the middle femur, the shape of the metaxyphus, the relative length of the hemelytral process and the membrane, and the spines of the hind tibia have been found to be of taxonomic value.

The ocular commissure has been used in the past for specific identification but this writer is reluctant to use this character extensively as it is weak when used in relative proportion to other body structures.

The male genital capsule was found to be characteristic of a species and was used as a double check on identification whenever male specimens were available.

KEY TO THE GENUS MARTAREGA

1. Species small, males not to exceed 4.3 mm. long or 1.2 mm. wide at pronotum; opaque median longitudinal stripe on hemelytra, bifurcate near apex ..... (2)
   Species larger, males not less than 4.9 mm. long or 1.2 mm. wide at pronotum; opaque median longitudinal stripe not bifurcate when present ..... (3)
2. Ventral surface of mesotrochanter smooth; hemelytral process usually extending to tip of membrane; crotch at bifurcation of hemelytral opaque stripe acutely angled ..... **M. membranacea**
   Ventral surface of mesotrochanter with a median nodule; hemelytral process not extending to tip of membrane; crotch at bifurcation of hemelytral opaque stripe rounded instead of acutely angled ..... **M. chinai**
3. Femur of second pair of legs of male with nodule present on ventral surface ..... (4)
   Femur of second pair of legs of male with no nodule present* ..... (5)
4. Nodule on femur located at a point level with distal extremities of articulation of trochanter and femur; mid-ventral keel with hair on antero-ventral and lateral surfaces ..... **M. hondurensis**
   Nodule on femur located at a point well beyond the distal extremities of articulation of trochanter and femur; mid-ventral keel with hair on lateral surface only ..... **M. mexicana**
5. Lateral margin of metatrochanter with sharp concavity at distal end; females with emarginated costal margin of hemelytra toothed; mid-ventral keel with hair on antero-ventral and lateral surfaces ..... **M. hungerfordi**
   Lateral margin of metatrochanter normal; females without teeth on emarginated costal margin of hemelytra; mid-ventral keel with hair on lateral margins only ..... (6)
6. Hemelytra largely hyaline with a single longitudinal opaque stripe not median; mesotrochanter of male with three or more small groups of short bristles located ventrally near outer lateral margin; females with several scattered hairs near outer lateral margin; left clasper of male genital capsule, three times as long as wide ..... **M. gonostyla**
   Hemelytra not as above; mesotrochanter of male with or without one or two small groups of short bristles located ventrally near

* We assume that male of **M. mcateei** fits here although we have no specimens.

outer lateral margin; left clasper of male genital capsule without great length ..... (7)

7. Mesotrochanter of male with one or two groups of short bristles located ventrally near outer lateral margin; hemelytra with a short median opaque stripe at base of wing ..... **M. williamsi**
Mesotrochanter without such groups of short bristles; hemelytra not as above ..... (8)

8. Species with no nodule on mesotrochanter and with no nodule on femur of second pair of legs ..... **M. brasiliensis**
Species with nodule on mesotrochanter of male but without nodule on femur of second pair of legs ..... (9)

9. Metaxyphus with apex sharply rounded; ocular commissure less than one-third the width of eye; hemelytral process two-thirds the length of membrane ..... **M. mcateei**
Metaxyphus with apex blunt to mediumly rounded; ocular commissure greater than one-third the width of eye; hemelytral process not more than one-half the length of membrane ..... (10)

10. Median longitudinal hyaline stripe of male hemelytra narrow with its median width approximately one-fifth the width of shiny costal area; female with basal exterior margin of hind femur emarginate; hemelytral process extends approximately one-third the length of membrane ..... **M. uruguayensis**
Median longitudinal hyaline stripe of male hemelytra wide, with its median width approximately two-thirds the width of shiny costal area; female without emarginate hind femur; hemelytral process extends approximately one-half the length of membrane ..... **M. bentoi**

Martarega membranacea White

(Plate I, fig. 4; Plate II, fig. 10; Plate III, figs. 1, 2.)

1879. **Martarega membranacea** White, F. B., Transactions of the Entomological Society of London, Vol. XVII, p. 271.
1899. **Martarega membranacea**, Kirkaldy, G. W., Bollettino dei Musei di Zoologia ed Anatomia Comparata della R. Universita di Torino, Vol. XIV, p. 9.
1904. **Martarega membranacea**, Kirkaldy, G. W., Wiener Entomologische Zeitung, Vol. XXIII, p. 126.
1909. **Martarega membranacea**, Kirkaldy, G. W. and Torre-Bueno, J. R. de la, The Proceedings of the Entomological Society of Washington, Vol. X, p. 201.
1928. **Martarega membranacea**, Jaczewski, T., Annales Musei Zoologica Polonici, Vol. VII, pp. 131-135.
1935. **Martarega membranacea**, De Carlo, J. A., Revista Argentina de Entomologia, Vol. 1, p. 3.
1948. **Martarega membranacea**, Hynes, H. B. N., The Transactions of the Royal Entomological Society of London, Vol. 99, pp. 341-360.

Size: Male: Length, 4.1 to 4.2 mm.; width of pronotum, 1.1 to 1.2 mm. Female: Length, 4.5 to 4.6 mm.; width of pronotum, 1.3 to 1.4 mm.

Color: Eyes pale to dark reddish-brown. Head, pronotum, scutellum, vertex, and abdomen yellowish or straw-colored. Limbs usually testaceous to pale yellow with dark brown to black markings at distal ends of segments. Hair on venter and sternum reddish-brown to black. Hemelytra hyaline with two longitudinal white opaque stripes; posterior stripe bifurcate near wing apex. Membrane opaque. Labrum light brown. Rostrum

yellowish with a median longitudinal brown stripe; last segment entirely dark brown to black.

Structural Characteristics: Anterior outline of head rounded as viewed from above. Vertex longer than its anterior width; anterior margin in male strongly convex; anterior margin in female wider than male and less convex. Inner margins of eyes slightly concave, converging posteriorly, becoming holoptic at a point midway the length of head. Ocular commissure long; longer than one-half the width of an eye. Pronotum arched; lateral margins slightly divergent and posterior margin moderately concave. Scutellum small, a little longer than pronotum. Hemelytral process extends to tip of membrane. Membrane not distinct. Legs normal; mesotrochanter smooth ventrally and rounded. Metaxyphus normal. Ventral abdominal keel with hair on lateral and antero-ventral surfaces. Macropterous forms with scutellum large and twice as wide as long. Lobes of membrane about equal. Male genital clasper as shown in Plate III.

Location of Types: The type specimens are located at the Perth Museum (Scotland). The type card has four specimens on it; the left hand two are females.

Comparative Notes: This species resembles **M. chinai** Hynes but can be distinguished from it by the absence of a nodule on the mesotrochanter of the male. The male genital claspers differ and the hemelytral process in this species extends to tip of membrane while that of **M. chinai** does not.

Data on Distribution:

Brazil: Manaos region, Rio Negro: October 1935, A. M. Olalla, 5 males, 5 females. **Castanha region, Rio Purus:** September 1935, A. M. Olalla, 73 males, 20 females. **Amazons, Manacapuru, Solimoes River:** June 1926, S. M. Klages, 14 males, 24 females. **Porto Velho, R. Madeira:** September 1937, A. M. Olalla, 3 males, 2 females. **Utinga Belém, Pará:** August 1946, L. & M. Deane, 3 males, 2 females; November 1946, 1 male; March 17, 1946, L. Deane, 1 male, 3 females.

Bolivia: Las Pampos, Mojos, Rio Beni: April 1938, A. M. Olalla, 1 male, 1 female; May 1938, 1 male, 2 females. **El Consuele:** January 1938, A. M. Olalla, 7 males, 6 females. **Santa Rosa del Yacuma:** February 1938, A. M. Olalla, 1 male, 2 females.

British Guiana: Kangarooma: January 16, 1938, S. Harris, 50 males, 41 females. **Supuruni Creek:** August 8, 1937, S. Harris, 4 males, 5 females; August 7, 1937, 3 females. **Honey Camp Cr.:** October 22, 1937, S. Harris, 16 males, 8 females; **Georgetown Bot. Gardens:** November 6, 1937, S. Harris, 7 males, 1 female; **Demerara:** July 26, 1932, S. Harris, 4 males, 6 females. **Lamaha Conservancy, E. Coast Demerara:** July 17, 1932, S. Harris, 15 males, 8 females. **Plantation Tuschen, Demerara:** August 10, 1932, S. Harris, 1 male, 1 female. **Canal Polder No. 2, W. Bank Demerara:** June 19, 1932, S. Harris, 4 males, 1 female.

All specimens listed above are in the Francis Huntington Snow Entomological Collections.

Martarega chinai Hynes

(Plate I, fig. 1; Plate II, fig. 9; Plate III, figs. 3, 4.)

1948. **Martarega chinai** Hynes, H. B. N., Transactions of the Royal Entomological Society of London, Vol. 99, pp. 341-360.

Size: Male: Length, 4.1 to 4.2 mm.; width of pronotum, 1.1 to 1.2 mm. Female: Length, 4.6 to 4.7 mm; width of pronotum, 1.2 to 1.4 mm.

Color: Eyes pale to light brown. Head, pronotum, scutellum and abdomen testaceous. Vertex testaceous to light brown. Limbs yellowish with dark brown markings at bases of femora. Hair on venter and sternum mostly black. Hemelytra hyaline with two longitudinal white opaque stripes; posterior stripe bifurcate near wing apex. Membrane opaque. Labrum light brown. Rostrum yellowish-brown with a median dorsal brown stripe; last segment entirely dark brown to black.

Structural Characteristics: Anterior outline of head rounded as viewed from above. Anterior margin of vertex slightly convex and less than its median length. Inner margins of eyes slightly concave, converging posteriorly, becoming holoptic at a point midway the length of head. Ocular commissure long; longer than one-half the width of an eye. Pronotum arched; lateral margins slightly divergent and posterior margin moderately concave. Scutellum small, approximating an equilateral triangle with lateral margins concave. Membrane not distinct. Hemelytral process does not extend to tip of membrane. Crotch at bifurcation of posterior opaque stripe on hemelytron great. Legs normal; mesotrochanter rounded with medianly located nodule on ventral surface of male; mesotrochanter rounded and smooth ventrally in female. Metaxyphus normal. Ventral abdominal keel with hair on lateral and antero-ventral surfaces. Macropterous forms with pronotum and scutellum much larger. Lobes of membrane about equal. Male genital clasper as shown in Plate III.

Location of Types: The type specimens are located at the British Museum (London).

Comparative Notes: This species closely resembles **M. membranacea** but can readily be distinguished by the presence of a nodule on the ventral surface of the mesotrochanter of the male. The crotch at the bifurcation of the posterior opaque stripe on the hemelytron is greater in this species and the shining stripe is wider. The hemelytral process does not extend to tip of membrane as it does in **M. membranacea.**

Data on Distribution:

Brazil: Amazons, Manacapuru, Solimoes River: June 1926, S. M. Klages, 51 males, 31 females. **Vic. Santa Antonio, River Eiru:** October 17, 1936, A. M. Olalla, 60 males, 29 females. **Vic. Joao Pessoa (Sao Phelipe), River Jurua:** September 20, 1936, A. M. Olalla, 78 males, 22 females. **Lago Bernry Region, Rio Purus:** September 1935, A. M. Olalla, 4 males, 2 females. **Castanha Region, Rio Purus:** September 1935, A. M. Olalla, 1 female.

Bolivia: R. Beni Puerto Salinas: November 1937, A. M. Olalla, 10 males, 10 females.

All specimens listed above are in the Francis Huntington Snow Entomological Collections.

Martarega hondurensis Bare

(Plate II, fig. 8; Plate IV, figs. 5, 6.)

1932. **Martarega hondurensis** Bare, C. O., Journal Kansas Entomological Society, Vol. V, p. 60.

Size: Male: Length, 5.0 to 5.3 mm.; width of pronotum, 1.2 to 1.3 mm. Female: Length, 5.4 to 5.6 mm.; width of pronotum, 1.3 to 1.5 mm.

Color: Eyes reddish-brown. Head, pronotum, scutellum, vertex, and abdomen yellowish. Limbs mostly yellowish with brown markings at basal and distal ends of some segments. Hair on abdomen and hind tibia and tarsus reddish-brown with mixed yellowish and reddish-brown hair on sternum. Hemelytra mostly white opaque with a single median longitudinal hyaline shining stripe; basal portion of shining stripe in female wide. A second short, narrow hyaline stripe proceeds anteriorly from base of hemelytral process approximately one-third length of hemelytron. Membrane opaque. Labrum brown. Rostrum yellowish with a median dorsal brown stripe; last segment and most of third segment brown to black.

Structural Characteristics: Anterior outline of head rounded as viewed from above. Vertex longer than its anterior width; anterior margin convex. Inner margins of eyes approximately straight and converging posteriorly, becoming holoptic at point midway the length of head. Ocular commissure two-fifths width of an eye. Pronotum arched; lateral margins slightly divergent and posterior margin strongly concave. Scutellum small; anterior width greater than its median length. Hemelytral process short, approximately one-half as long as membrane. Mesotrochanter smooth ventrally and rounded; middle femur of male with a nodule located at a point level with distal extremities of articulation of trochanter and femur. Metaxyphus subtriangular with sharply rounded apex; lateral margins with slight indentation near apex. Macropterous forms with scutellum large and thoracic region wide and strong. Lobes of membrane about equal. Ventral abdominal keel with hair on lateral and antero-ventral surfaces. Male genital clasper as shown in Plate IV.

Location of Types: Holotype male, allotype female, and 399 paratypes, Rio Grande, British Hondurus, November 1931, J. J. White, in the Francis Huntington Snow Entomological Collections, University of Kansas.

Comparative Notes: This species is similar to **M. mexicana** n. sp. but can be readily distinguished from that species by the presence of a nodule on middle femur at a level with distal extremities of articulation of trochanter and femur. The hemelytral process is not as long and more tapering than that of **M. mexicana**. The male genital clasper is similar to that of **M. uruguayensis**.

Data on Distribution: In addition to the type series.

British Honduras: Punta Gorda: 1932, J. J. White, 17 males, 9 females.

Guatemala: Yzabel Lk.: April 13, 1947, R. R. Miller, 1 male.

Mexico: Campeche, Champoton Janataya: July 9, 1932, E. P. Creaser, 1 male, 1 female.

Canal Zone: Ft. Clayton: November 11, 1932, R. F. Edwards, 88 males, 51 females.

Peru: Lima, Vic. of Sani Beni 840 m.a.s.l.: November 5, 1935, F. Woytkowski, 22 males, 15 females.

All specimens listed above are in the Francis Huntington Snow Entomological Collections.

Martarega mexicana n. sp.

(Plate I, figs. 2, 3.)

Size: Male: Length, 5.8 to 5.9 mm.; width of pronotum, 1.4 to 1.5 mm. Female: Length, 6.4 to 6.6 mm.; width of pronotum, 1.5 to 1.6 mm.

Color: Eyes pale to dark reddish-brown. General body color yellowish or straw colored. Limbs yellowish with black at distal ends of segments. Femora each with incomplete brown to black median longitudinal stripe on ventral surface. Basal margins of metaxyphus and various other areas of venter black. Hair on venter reddish-brown to black. Labrum brown. Rostrum yellowish with median longitudinal brown to black stripe; last segment entirely black. Hemelytron largely white opaque with a single longitudinal hyaline shining stripe, median; very narrow in male, wide for basal three-fourths in female. A second short narrow hyaline stripe proceeds anteriorly from base of hemelytral process approximately one-third length of hemelytron.

Structural Characteristics: Anterior outline of head rounded as viewed from above. Anterior margin of vertex slightly convex and not as wide as its median length. Inner margins of eyes slightly concave and converging posteriorly, becoming holoptic at point approximately midway the length of head. Ocular commissure approximately one-half width of an eye. Pronotum arched; lateral margins slightly divergent, posterior margin strongly concave. Scutellum small; slightly longer than median length of pronotum. Hemelytral process three-fourths length of membrane of male but short and broad at base in female and approximately one-third length of membrane. Mesotrochanter smooth ventrally and rounded; middle femur of male with a nodule on ventral surface located at a point well beyond the distal extremities of articulation of trochanter and femur. Metaxyphus subtriangular with sharply rounded apex and slight indentation of lateral margins near apex. Ventral abdominal keel with hair on lateral margins only. Male genital clasper as shown in Plate I.

Location of Types: Holotype male, allotype female, 5 male and 6 female paratypes, Acatlipa Mor., Mexico, January 1946, J. G. Shaw; 3 male and 5 female paratypes, Acatlipa Mor., Km. 88 on Hgw. Mexico City to Acapulco, May 6, 1945, J. G. Shaw, in Francis Huntington Snow Entomological Collections, University of Kansas.

Comparative Notes: This species is similar to **M. hondurensis** Bare but can be distinguished from it by the location of the nodule on the middle femur, the presence of hair on lateral margins of abdominal keel only, and the shape of the male genital clasper.

Data on Distribution: In addition to the type series.

Guatemala: Rio de Paz of San Diego, Pon. M. Hyw: April 15, 1947, M. R. Miller, 2 males, 1 female. (Francis Huntington Snow Entomological Collections).

Martarega hungerfordi n. sp.
(Plate I, fig. 6; Plate II, fig. 4; Plate IV, figs. 1, 2.)

Size: Male: Length, 5.4 to 5.6 mm.; width of pronotum, 1.41 to 1.58 mm. Female: Length, 6.5 to 6.6 mm.; width of pronotum, 1.47 to 1.62 mm.

Color: Eyes reddish-brown. General body color yellowish or straw colored. Limbs mostly yellowish with large areas, especially basal segments, dark brown to black. Hair on venter black. Labrum dark brown to black. Rostrum dark brown to black. Hemelytra mostly white opaque; male with narrow median longitudinal hyaline stripe, female with median hyaline stripe much wider and irregular in form. In both sexes, a second narrow, indistinct hyaline stripe proceeds anteriorly from base of hemelytral process one-third length of hemelytron. Costal opaque band and membrane infuscated with extreme costal area translucent but mostly brown.

Structural Characteristics: Anterior outline of head rounded as viewed from above. Anterior margin of vertex slightly convex, not as wide as its median length. Inner margins of eyes slightly concave, converging posteriorly, becoming holoptic at a point midway the length of head. Ocular commissure a little longer than one-half the width of an eye. Pronotum arched; posterior margin concave, lateral margins moderately divergent. Scutellum small, anterior width greater than its median length. Hemelytra with costal margin emarginate; female with at least sixteen strong teeth on emarginated costal margin. Hemelytral process long, approximately three-fourths as long as membrane. Mesotrochanter smooth ventrally and rounded; metatrochanter with sharp concavity at distal end. Metaxyphus trilobed; median lobe mediumly rounded. Ventral abdominal keel with hair on lateral and antero-ventral surfaces. Right clasper of male genital capsule larger than left, and shaped as shown in Plate IV.

Location of Types: Holotype male, allotype female, 36 male and 22 female paratypes, Supuruni Creek, British Guiana, August 7, 1937, S. Harris; 36 male and 11 female paratypes, August 8, 1937, same place and collector, in Francis Huntington Snow Entomological Collections, University of Kansas.

Comparative Notes: This species resembles no other species closely but is similar to **M. williamsi** n. sp. It differs from **M. williamsi** in the toothed emarginate costal area of the female hemelytra, lack of hair tufts on ventral surface of male mesotrochanter, and shape of the male genital clasper. The metatrochanter of this species has the distal end sharply concave.

Data on Distribution: Known only from type series.

Martarega gonostyla n. sp.
(Plate I, figs. 5, 7; Plate II, figs. 1, 5.)

Size: Brachypterous: Male, length 5.7 to 5.9 mm.; width of pronotum 1.4 to 1.5 mm. Female, length 6.4 to 6.5 mm.; width of pronotum 1.5 to 1.6 mm. Macropterous: Male, length 5.85 to 5.9 mm.; width of pronotum 1.69 to 1.7 mm. Female, length 6.5 to 6.6 mm.; width of pronotum 1.75 mm.

Color: Eyes dark gray to reddish-brown. General body color yellowish or straw colored. Limbs yellowish with dark brown to black markings mostly as stripes on femora. Labrum brown. Rostrum with first two seg-

ments mostly yellowish with a brown median area on second segment; last two segments mostly dark brown to black. Hair on abdomen, sternum, and legs reddish-brown. Hemelytra almost entirely hyaline, with a single opaque stripe extending almost entire length of hemelytron near costal margin; costal opaque margin and membrane infuscated. Hemelytra of macropterous forms dark brown to black with a single median shining stripe running length of each hemelytron.

Structural Characteristics: Anterior outline of head rounded as viewed from above. Anterior margin of vertex convex, approximately as wide as median length. Inner margins of eyes nearly straight, converging posteriorly, becoming holoptic at a point approximately midway length of head. Ocular commissure two-fifths width of an eye. Pronotum arched; posterior margin concave, lateral margins moderately divergent. Scutellum small; anterior width greater than median length. Hemelytral process one-half as long as membrane, extending almost to tip. Mesotrochanter of male rounded with three or four small groups of short bristles located ventrally near outer lateral margin; mesotrochanter of female with several scattered hairs near outer lateral margin. Metaxyphus normal. Ventral abdominal keel with hair on lateral margins only. Left genital clasper of male three times as long as wide as shown in Plate II.

Location of Types: Holotype male, allotype female, 3 male and 1 female paratypes, R. Beni Cachuela, Esperanza, Bolivia, September 1937, A. M. Olalla; 4 male and 3 female paratypes, Rio Negro, Manãos Region, Brazil, October 1935, A. M. Olalla, in the Francis Huntington Snow Entomological Collections, University of Kansas.

Comparative Notes: This species resembles **M. williamsi** n. sp. in general appearance but can be readily distinguished from it by the three to four small groups of bristles on the male mesotrochanter, the presence of only one opaque stripe on hemelytron, and the radical shape of the left genital clasper.

Date on Distribution: Known only from type series.

Martarega williamsi n. sp.
(Plate II, fig. 6; Plate III, figs. 5, 6.)

Size: Brachypterous: Male, length 5.3 to 5.4 mm.; width of pronotum 1.3 to 1.4 mm. Female, length 6.0 to 6.1 mm.; width of pronotum 1.5 to 1.6 mm. Macropterous: Male, length 5.9 to 6.0 mm.; width of pronotum 1.6 to 1.7 mm. Female, length 6.4 to 6.5 mm.; width of pronotum 1.7 to 1.8 mm.

Color: Eyes dark gray to reddish-brown. General body color yellowish-white to yellow. Limbs yellowish with brown stripe on middle femur and brown markings on segments of all limbs, especially distally. Labrum brown. Rostrum with first two segments mostly yellowish and a brown median area on second segment; last two segments mostly dark brown to black. Hair on abdomen and sternum as well as legs, reddish-brown. Hemelytra largely hyaline, with a short median longitudinal opaque stripe running posteriorly for approximately one-third length of hemelytron; a second longitudinal opaque stripe in costal area extends entire length of hemelytron and much wider than the short median stripe. Hemelytra of macropterous

forms dark brown to black with single yellowish-white median longitudinal stripe; costal margin yellowish-white.

Structural Characteristics: Anterior outline of head rounded as viewed from above. Anterior margin of vertex convex, approximately as wide as median length. Inner margins of eyes nearly straight, converging posteriorly, becoming holoptic at a point approximately midway length of head. Ocular commissure two-fifths the width of an eye. Pronotum arched; posterior margin concave, lateral margins moderately divergent. Scutellum small; anterior margin a little greater than median length. Hemelytral process approximately one-third length of membrane and wide at base. Mesotrochanter rounded; male with one or two groups of short bristles located ventrally near outer lateral margin. Metaxyphus normal. Front femur of male with a medium length spine and two short ones; female with a very long spine and two short ones. Ventral abdominal keel with hair on lateral margins only. Male genital clasper as shown in Plate III.

Location of Types: Holotype male, allotype female, 2 male paratypes, Tena, Ecuador, February 23, 1923, F. X. Williams; other paratypes as follows: 3 females, February 28, 1923, same place and collector; 1 male and 3 females, Tena, near Oriente, Ecuador, March 29-April 10, 1923, F. X. Williams; 36 males and 39 females, Vic. Afilador Jungle, Dept. Huanuca, Peru, June 3-7, 1937, F. Woytkowski; 7 males and 10 females, June 8-9, 1937, same place and collector. All specimens in type series are in the Francis Huntington Snow Entomological Collections, University of Kansas.

Comparative Notes: This species is similar to **M. gonostyla** n. sp. but can be readily distinguished from this species by the presence of only one or two groups of short bristles on male mesotrochanter, the short median opaque stripe on hemelytra, and the radically different male genital claspers.

Data on Distribution: In addition to type series.

Gualaguiza: 1 female, no other data.

Canal Zone: Fort Clayton: November 11, 1932, R. F. Edwards, 4 males, 20 females.

Peru: Vic. Sani Beni, River Sani Beni: September 5, 1935, F. Woytkowski, 11 males, 19 females; October 9, 1935, 4 males, 2 females; October 11, 1935, 1 male, 3 females; October 17, 1935, 1 female; October 20, 1935, 1 male October 24, 1935, 1 male, 1 female; November 4, 1935, 5 males, 4 females; No date, 2 males, 1 female. **Satipo:** November 1942, Pedro Paprzyki, 4 males, 16 females; December 1942, 9 males, 12 females. **Dept. Huanuco, Loc. Shapajilla:** July 26, 1938, F. Woytkowski, 1 male, 4 females; August 1938, 5 males, 7 females. **Loreto, Boqueron del Padre, Abad Cordillera, Azul Dept.:** August 3, 1946, F. Woytkowski, 10 males, 6 females. **Aguaitia Dept. de Loreto:** September 19, 1946, F. Woytkowski, 2 males, 5 females. **Loreto, Santa Elena, Boqueron del Padre, Abad Dept.:** August 8, 1946, F. Woytkowski, 5 females.

Brazil: Vic. Santo Antonio, River Eiru: September 25, 1936 and October 17, 1936, A. M. Olalla, 18 males, 23 females.

All specimens listed above are in the Francis Huntington Snow Entomological Collections.

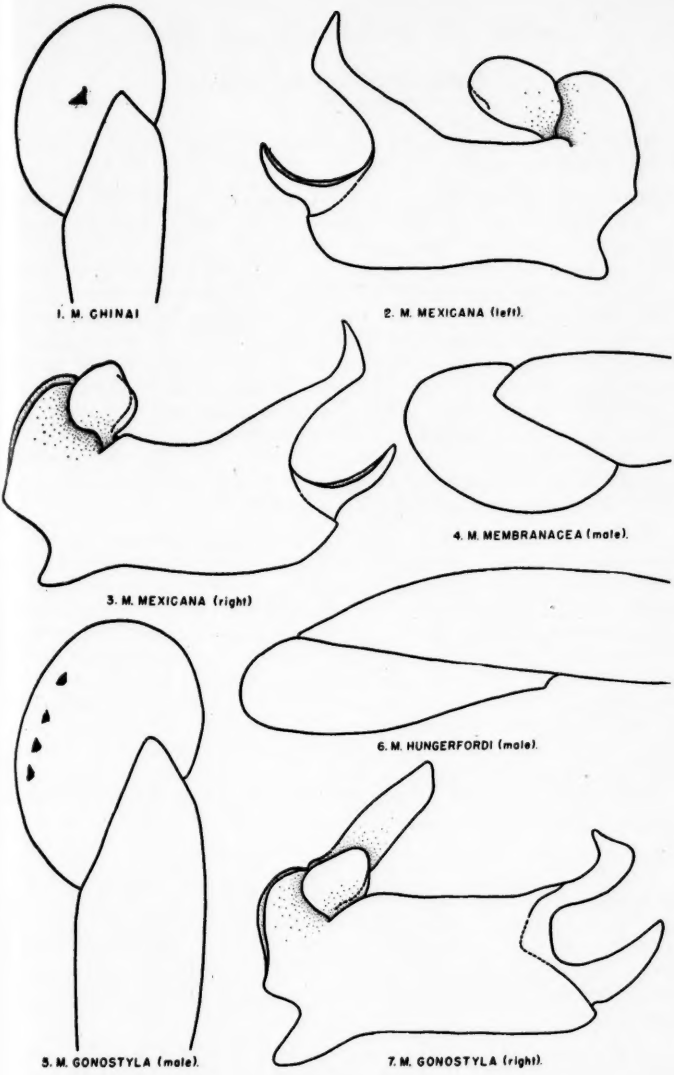


PLATE I

Fig. 1. **Martarega chinai** Hynes; mesotrochanter of male.
Fig. 2. **Martarega mexicana** n. sp.; left view of genital capsule.
Fig. 3. **Martarega mexicana** n. sp.; right view of genital capsule.
Fig. 4. **Martarega membranacea** White; mesotrochanter of male.
Fig. 5. **Martarega gonostyla** n. sp.; mesotrochanter of male.
Fig. 6. **Martarega hungerfordi** n. sp.; metatrochanter of male.
Fig. 7. **Martarega gonostyla** n. sp.; right view of genital capsule.

Martarega brasiliensis n. sp.
(Plate IV, figs. 3, 4.)

Size: Male: length, 5.2 to 5.35 mm.; width of pronotum, 1.2 to 1.3 mm. Female: length, 5.6 to 5.8 mm.; width of pronotum, 1.3 to 1.4 mm.

Color: Eyes reddish-brown. General body color yellowish or straw colored. Limbs usually yellowish with brown to black markings at joints; basal portion of all limbs dark brown. Hair on venter dark brown to black. Labrum dark brown. Rostrum yellowish with a median longitudinal brown to black stripe; last segment entirely black. Hemelytra mostly white opaque; male with a single narrow median longitudinal hyaline stripe, and a second short shining stripe which proceeds anteriorly from base of hemelytral process approximately one-third distance of hemelytron; female with median longitudinal hyaline stripe wide for three-fourths of length and narrowing posteriorly, a second narrow hyaline stripe proceeds anteriorly from base of hemelytral process approximately one-third length of hemelytron, while yet a third hyaline stripe runs anteriorly from near base of hemelytral process almost entire length of wing. Scutellum white opaque in both sexes except for elliptical to diamond-shaped hyaline area at apex.

Structural Characteristics: Anterior outline of head rounded as viewed from above. Anterior margin of vertex in male as wide as median length while in female wider than its median length; convex in both sexes. Inner margins of eyes slightly convex, converging posteriorly to become holoptic at a point approximately midway length of head. Ocular commissure equal to median length of vertex and one-half width of an eye. Pronotum arched; posterior margin concave and lateral margins moderately divergent. Scutellum small, anterior width greater than median length. Hemelytral process wide at base, approximately one-half as long as membrane. Membrane not distinct. Mesotrochanter of male rounded, ventral surface with very slightly swollen area near basal point of articulation with femur covered with fine light yellow hair. Metaxyphus normal. Ventral abdominal keel with hair on lateral margins only. Male genital clasper as shown in Plate IV.

Location of Types: Holotype male, allotype female, 16 male and 15 female paratypes, Pernambuco, Brazil, January 31, 1935, Revino D. Bento; other paratypes as follows: 2 males and 1 female, Acude São Bento, nr. Maranguape, Ceara, Brazil, November 6, 1937, Via. S. Wright; 4 males and 2 females, S. Loverenco, July 18, 1937, S. Wright. All specimens of type series in the Francis Huntington Snow Entomological Collections, University of Kansas.

Comparative Notes: This species resembles **M. bentoi** n. sp. but can be distinguished from it by the absence of a nodule on the male mesotrochanter and the shape of the male genital clasper.

Data on Distribution: In addition to type series.

Peru: Lorete, Aguaitia Dept.: September 19, 1946, F. Woytkowski, 20 males and 36 females (Francis Huntington Snow Entomological Collections).

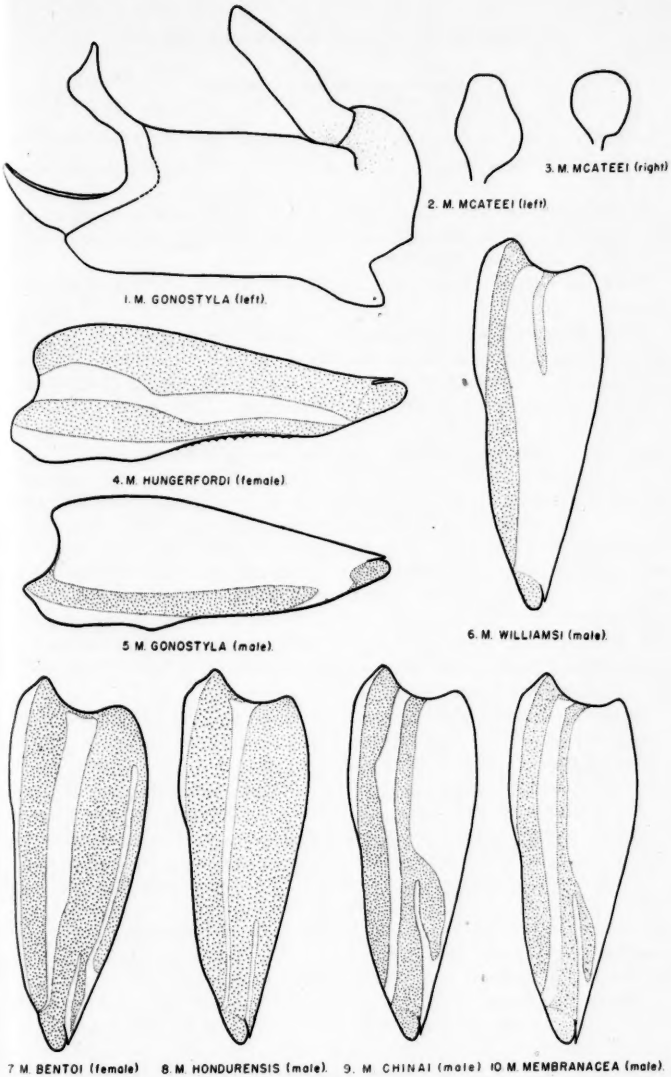

1. M. GONOSTYLA (left).
2. M. MCATEEI (left)
3. M. MCATEEI (right)
4. M. HUNGERFORDI (female).
5 M. GONOSTYLA (male).
6. M. WILLIAMSI (male).
7 M. BENTOI (female)
8. M. HONDURENSIS (male).
9. M. CHINAI (male)
10. M. MEMBRANACEA (male).

PLATE II

Fig. 1. **Martarega gonostyla** n. sp.; left view of genital capsule.
Fig. 2. **Martarega mcateei** Jaczewski; left clasper of male.
Fig. 3. **Martarega mcateei** Jaczowski; right clasper of male.
Fig. 4. **Martarega hungerfordi** n. sp.; hemelytron of female.
Fig. 5. **Martarega gonostyla** n. sp.; hemelytron of male.
Fig. 6. **Martarega williamsi** n. sp.; hemelytron of male.
Fig. 7. **Martarega bentoi** n. sp.; hemelytron of female.
Fig. 8. **Martarega hondurensis** Bare; hemelytron of male.
Fig. 9. **Martarega chinai** Hynes; hemelytron of male.
Fig. 10. **Martarega membranacea** White; hemelytron of male.

Martarega mcateei Jaczewski

(Plate II, figs. 2, 3.)

1928. **Martarega mcateei** Jaczewski, T., Annales Musei Zoologica Polonici, Vol. VII, pp. 131-135.
1932. **Martarega mcateei**, Bare, C. O., Journal Kansas Entomological Society, Vol. V, p. 60.

In the following description, the characters of the male are adapted from the original by Jaczewski 1928 (loc. cit.). The drawings of the male genital claspers are also taken from the same work.

Size: Male: length, 8 mm. Female: length, 8.2 mm.; width of pronotum, 2.1 mm.

Color: Eyes dark brown, reddish to blackish. Head, pronotum, scutellum and hemelytra yellowish-white; underside of body and limbs yellowish with somewhat incomplete dark brown to black stripe along all the femora, as well as extreme ends of tibial and tarsal joints. Labrum brown. Rostrum yellowish with median longitudinal dark brown stripe; last segment entirely black. Hair on abdomen, sternum, and legs mostly dark, reddish-brown to black. Hemelytra opaque, yellowish-white, outer margin of corium and apex of membrane more or less infuscated. Female with a median, wide, knife-shaped longitudinal hyaline stripe and a second very narrow hyaline stripe which proceeds anteriorly from base of hemelytral process approximately one-third length of hemelytron. Hemelytral pattern same in male with median longitudinal hyaline stripe narrow and not knife-shaped. Scutellum small, with elliptical to diamond-shaped hyaline spot at apex. In macropterous specimen of Jaczewski, scutellum and hemelytra are brown with shining portions yellow, and with a yellow triangular stripe along the folding of membrane.

Structural Characteristics: Anterior outline of head rounded as viewed from above. Anterior margin of vertex less than median length and convex. Inner margins of eyes approximately straight converging posteriorly, becoming holoptic at a point more than two-thirds the median length of head. Ocular commissure very short, less than one-third the width of an eye. Pronotum arched; posterior margin slightly concave, lateral margins moderately divergent. Scutellum small; anterior margin approximately as wide as median length. Hemelytral process of female stout, approximately two-thirds length of membrane. Posterior margin of membrane emarginate adjacent to hemelytral process in female at least. Metaxyphus with lateral margins indented and apex sharply rounded. Ventral abdominal keel with hair on lateral margins only. Genital claspers of male as shown in Plate II.

Location of Types: A slide prepared of a brachypterous male was chosen as a type by Jaczewski. In his collection was 1 male macropterous, 20 males and 23 females brachypterous. Jaczewski's material is thought to have perished in the Polish Museum during World War II. From his original collection a brachypterous female from R. Claro, Serra da Esperanca, Paraná, Brazil is now in the C. O. Bare Collection.

Comparative Notes: This species resembles in general appearance M. **uruguayensis** Berg but is larger and more robust. The ocular commissure is shorter and the male genital claspers differ.

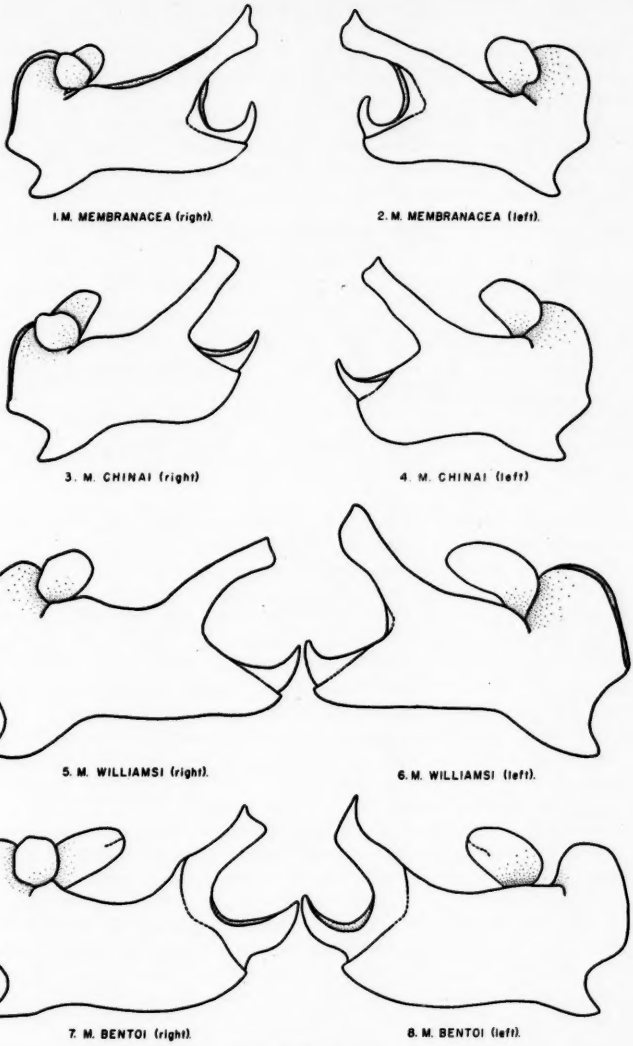

1. M. MEMBRANACEA (right).
2. M. MEMBRANACEA (left).
3. M. CHINAI (right)
4. M. CHINAI (left)
5. M. WILLIAMSI (right).
6. M. WILLIAMSI (left).
7. M. BENTOI (right).
8. M. BENTOI (left).

PLATE III

Fig. 1. **Martarega membranacea** White; right view of male genital capsule.
Fig. 2. **Martarega membranacea** White; left view of male genital capsule.
Fig. 3. **Martarega chinai** Hynes; right view of male genital capsule.
Fig. 4. **Martarega chinai** Hynes; left view of male genital capsule.
Fig. 5. **Martarega williamsi** n. sp.; right view of male genital capsule.
Fig. 6. **Martarega williamsi** n. sp.; left view of male genital capsule.
Fig. 7. **Martarega bentoi** n. sp.; right view of male genital capsule.
Fig. 8. **Martarega bentoi** n. sp.; left view of male genital capsule.

Data on Distribution:

Brazil: Paraná, Rio Claro, Serra da Esperanca: February 10, 1932, T. Jaczewski, 1 female (C. O. Bare Collection).

The author, T. Jaczewski, has as his data on distribution the following:

Brazil: Paraná, Rio Claro, Serra da Esperanca: February 10, 1922, T. Jaczewski, 21 males, 23 females; **Rio Putinga:** March 12, 1922, T. Jaczewski, 1 female.

Martarega uruguayensis (Berg)

(Plate IV, figs. 7, 8.)

1883. **Signoretiella uruguayensis,** Berg, C., Anales de la Sociedad cientifica Argentina, Vol. XVI, p. 122.
1884. **Signoretiella uruguayensis,** Berg, C., Addenda et Emendanda ad Hemiptera Argentina, Bonariae et Hamburgo, pp. 121-124.
1897. **Signoretiella uruguayensis,** Kirkaldy, G. W., Transactions of the Entomological Society of London, pp. 394-426.
1899. **Signoretiella uruguayensis,** Kirkaldy, G. W., Bollettino dei Musei di Zoologia ed Anatomia Comparata della R. Universita di Torino, Vol. XIV, p. 9. (Gives **Signoretiella** Berg as synonym).
1904. **Signoretiella uruguayensis,** Kirkaldy, G. W., Wiener Entomologische Zeitung, Vol. XXIII, p. 126.
1909. **Signoretiella uruguayensis,** Kirkaldy, G. W., and Torre-Bueno, J. R. de la, The Proceedings of the Entomological Society of Washington, Vol. X, p. 201.
1928. **Martarega uruguayensis,** Jaczewski, T., Annales Musei Zoologica Polonici, Vol. VII, pp. 131-135.

Size: Male: length, 5.2 to 5.5 mm.; width of pronotum, 1.2 to 1.4 mm. Female: length, 5.8 to 5.9 mm.; width of pronotum, 1.3 to 1.47 mm.

Color: Eyes reddish-brown. General body color yellowish-white to straw colored. Limbs yellowish with black markings on distal ends of segments and bases of femora. Labrum brown. Rostrum yellowish with dark brown median stripe; last segment entirely dark brown to black. Hair on abdomen, sternum, and limbs reddish-brown to black. Hemelytra largely white opaque; male with a narrow median longitudinal hyaline stripe running entire length of hemelytron; female with median hyaline stripe varying in width but always wider than that of male. A second narrow hyaline stripe in both sexes proceeds anteriorly from base of hemelytral process approximately one-third length of hemelytron. Scutellum white opaque with elliptical to diamond-shaped hyaline spot at apex.

Structural Characteristics: Anterior outline of head rounded as viewed from above. Anterior margin of vertex convex, wider than median length. Inner margins of eyes nearly straight, converging posteriorly, becoming holoptic at a point approximately midway the length of head. Ocular commissure approximately two-fifths the width of an eye. Pronotum arched; posterior margin concave, lateral margins moderately divergent. Scutellum small; anterior width approximately same as median length. Hemelytral process extends approximately one-third the length of membrane. Ventral surface of male mesotrochanter with medianly located nodule. Base of hind femur in female shows an emargination exteriorly, varying in length from base of femur to a point level with distal end of metatrochanter to points some distance beyond. The larger spines inserted on inner margins of hind femora of both sexes vary in number from five to eight. Metaxyphus with apex bluntly rounded. Ventral abdominal keel with hair on lateral margins only. Male genital claspers as shown in Plate IV.

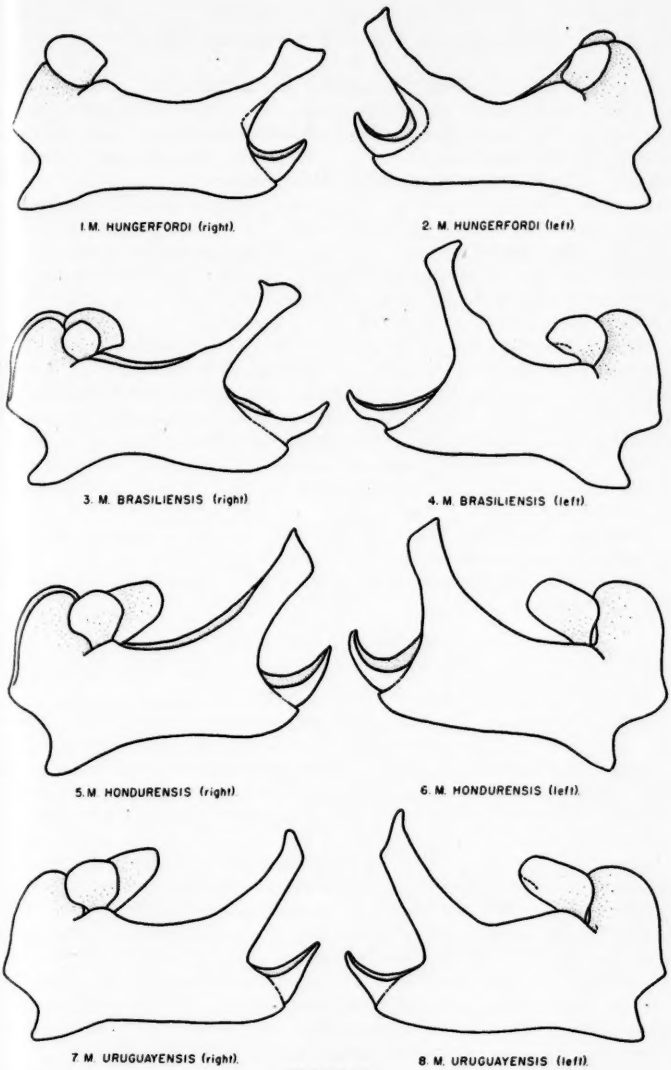

1. M. HUNGERFORDI (right).
2. M. HUNGERFORDI (left).
3. M. BRASILIENSIS (right).
4. M. BRASILIENSIS (left).
5. M. HONDURENSIS (right).
6. M. HONDURENSIS (left).
7. M. URUGUAYENSIS (right).
8. M. URUGUAYENSIS (left).

PLATE IV

Fig. 1. **Martarega hungerfordi** n. sp.; right view of male genital capsule.
Fig. 2. **Martarega hungerfordi** n. sp.; left view of male genital capsule.
Fig. 3. **Martarega brasiliensis** n. sp.; right view of male genital capsule.
Fig. 4. **Martarega brasiliensis** n. sp.; left view of male genital capsule.
Fig. 5. **Martarega hondurensis** Bare; right view of male genital capsule.
Fig. 6. **Martarega hondurensis** Bare; left view of male genital capsule.
Fig. 7. **Martarega uruguayensis** Berg; right view of male genital capsule.
Fig. 8. **Martarega uruguayensis** Berg; left view of male genital capsule.

One male specimen which I have for examination varies strikingly in size from the other male specimens taken at the same locality, by the same collector, at the same time. The structural characteristics are identical, however, except that they are on a larger scale. This specimen measures 6.63 mm. in length and 1.68 mm. wide at the pronotum.

Location of Types: The types are located in the Museum La Plata, Buenos Aires, with C. Berg's Hemiptera collection.

Comparative Notes: This species is similar to **M. bentoi** n. sp. but can be distinguished from it by the emarginated hind femora of the female, the bluntly rounded apex of the metaxyphus, and the shape of the male genital clasper.

Data on Distribution:

Brazil: Pernambuco: January 31, 1935, Revino D. Bento, 2 females (Francis Huntington Snow Entomological Collections). **Nova Teutonia:** December 1946, Fritz Plaumann, 2 males, 4 females; May 1948, 3 males, 2 females (Francis Huntington Snow Entomological Collections).

Bolivia: Santa Cruz: No date, J. Steinbach, 2 females. Compared with type by H. B. Hungerford, 1928. (Francis Huntington Snow Entomological Collections).

Paraguay: Caravoni: December 18, 1924, Francisco Schade, 1 female (Francis Huntington Snow Entomological Collections).

Isla Carapachai (Country unknown): 1907, E. Autron, 1 male (U. S. National Museum).

Martarega bentoi n. sp.

(Plate II, fig. 7; Plate III, figs. 7, 8.)

Size: Male: length, 5.2 to 5.3 mm.; width of pronotum, 1.3 to 1.4 mm. Female: length, 5.7 to 5.8 mm.; width of pronotum, 1.37 to 1.4 mm.

Color: Eyes dark gray to reddish-brown. General body color yellowish or straw colored. Limbs yellowish in color with dark brown to black markings mostly basal on segments. Labrum brown. Rostrum yellowish with a median longitudinal brown stripe; last segment entirely black. Hair on abdomen and sternum reddish-brown to black. Hemelytra largely white opaque; male with one narrow median longitudinal hyaline stripe and a second short hyaline stripe which proceeds anteriorly from base of hemelytral process one-third the length of hemelytron; female with median longitudinal hyaline stripe wide for three-fourths of distance, narrowing distad; a second narrow hyaline stripe in female proceeds anteriorly from base of hemelytral process approximately one-third the length of hemelytron, while yet a third hyaline stripe runs anteriorly from near base of hemelytral process almost entire length of hemelytron. Scutellum white opaque in both sexes with elliptical to diamond-shaped hyaline spot at apex.

Structural Characteristics: Anterior outline of head rounded as viewed from above. Anterior margin of vertex in male as wide as median length, in female wider than median length; convex in both sexes. Inner margins of eyes slightly convex, converging posteriorly, becoming holoptic just anterior to a point midway the length of head. Ocular commissure approximately one-half the width of an eye. Pronotum arched; posterior

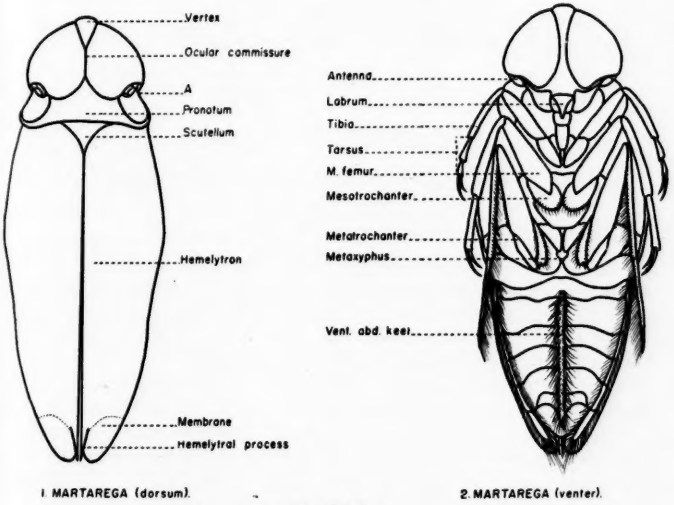
margin slightly concave, lateral margins moderately divergent. Scutellum small; anterior width greater than median length. Hemelytral process extends approximately one-half the length of membrane; wide at base in female. Mesotrochanter of male rounded with medianly located nodule on ventral surface. Metaxyphus with apex mediumly rounded. Ventral abdominal keel with hair on lateral margins only. Male genital clasper as shown in Plate III.

Location of Types: Holotype male, allotype female, 1 male and 9 female paratypes, Pernambuco, Brazil, January 31, 1935, Revino D. Bento, in the Francis Huntington Snow Entomological Collections, University of Kansas.

Comparative Notes: This species is similar to **M. uruguayensis** Berg but can be distinguished from it by the lack of the emarginated hind femora of the female, the wider median longitudinal hyaline stripe of the male hemelytron, and the shape of the male genital clasper.

Data on Distribution: In addition to type series.

Brazil: Pernambuco, Tapera: November 19, 1934, 1 female, no other data (Francis Huntington Snow Entomological Collections).



1. MARTAREGA (dorsum). 2. MARTAREGA (venter).

PLATE V

Fig. 1. **Martarega membranacea** White; dorsal view of brachypterous male; A=anterior lateral angle of the pronotum.

Fig. 2. **Martarega membranacea** White; ventral view of brachypterous male; Vent. abd. keel=ventral abdominal keel.

BIBLIOGRAPHY

1. Bare, C. O. (1932). A Martarega from British Honduras (Hemiptera, Notonectidae). Journal Kansas Entomological Society, vol. 5, p. 60.
2. Berg, C. (1883). A New Genus of Notonectidae (Hemiptera). Anales de la Sociedad cientifica Argentina, vol. 16, p. 122.
3. Berg, C. (1884). Addenda Et Emendanda Ad Hemiptera Argentina, Bonariae et Hamburgo, pp. 121-123.
4. De Carlo, J. A. (1935). Hemiptèros Acuaticos y Semiacuaticos, Especies no Citadas para la Argentina. Revista Argentina de Entomologia, vol. 1, p. 3.
5. Hale, H. M. (1924). Two New Hemiptera from New South Wales. Proceedings of the Linnean Society of New South Wales, vol. XLIX, pp. 462-463.
6. Hungerford, H. B. (1919). The Biology and Ecology of Aquatic and Semiaquatic Hemiptera, University of Kansas Science Bulletin, vol. 11, pp. 1-328.
7. Hungerford, H. B. (1919). The Male Genital Capsules as a Character of Specific Value in Certain Cryptocerata (Hemiptera-Heteroptera). Bulletin of the University of Kansas, vol. 21, pp. 329-331.
8. Hungerford, H. B. (1933). The Genus Notonecta of the World. University of Kansas Science Bulletin, vol. XXI, pp. 9, 10, 12, 22.
9. Hungerford, H. B. (1946). A New Genus and Species of the Family Notonectidae. Journal of the Kansas Entomological Society, vol. 19, pp. 59-61.
10. Hynes, H. B. N. (1948). Notes on the Aquatic Hemiptera-Heteroptera of Trinidad and Tobago, B. W. I., with a Description of a New Species of **Martarega** B. White (Notonectidae). The Transactions of the Royal Entomological Society of London, vol. 99, pp. 341-360.
11. Jaczewski, T. (1928). Notonectidae from the State of Parana. Annales Musei Zoologica Polonici, vol. 7, pp. 131-135.
12. Kirkaldy, G. W. (1897). Transactions of the Entomological Society of London, pp. 394-426.
13. Kirkaldy, G. W. (1899). Viaggio del Dr. Enrico Festa nell' Eucador e regioni vicine XIV. **Aquatic Rhynchota.** Bollettino dei Musei di Zoologia ed Anatomia Comparata della R. Universita di Torino, vol. 14, p. 9.
14. Kirkaldy, G. W. (1904). Uber Notonectiden (Hemiptera). Wiener Entomologische Zeitung, vol. 23, p. 126.
15. Kirkaldy, G. W. and Torre-Bueno, J. R. de la (1909). A Catalogue of American Aquatic and Semiaquatic Hemiptera. The Proceedings of the Entomological Society of Washington, vol. 10, p. 201.
16. White, F. B. (1879). List of the Hemiptera Collected in the Amazons by Prof. J. W. Trail, M.S., M.D., in the Years 1873-1875, with Descriptions of the New Species. Transactions of the Entomological Society of London, part 4, p. 271.

SOME NEW RANATRA FROM THE AMERICAS

LOUIS C. KUITERT*

Ranatra attenuata sp. n.

Size: Length from tip of beak to tip of abdomen of male 40 mm.; length of respiratory appendages 35 mm. Length of body of female 47 mm.; length of respiratory appendages 41 mm.

Color: A very dark brown color over entire body.

Shape: A slender elongate species.

Structural characteristics: Body moderately stout, eyes transverse and globular with a slight indication of the anterior mesal margin being sinuate, transverse width of one eye about one and one-third times width of interocular space. Vertex convex; in lateral view the vertex is not raised above the level of the eyes. Jugae prominent, slightly divergent, separated from tylus by a prominent fissure. Antenna with lateral prolongation of penulti-

* Contribution from the Department of Entomology, University of Kansas

mate segment cylindrical and nearly as long as ultimate segment. Prothorax long and narrow; width of anterior portion distinctly less than width of head through eyes. Length of anterior portion of pronotum 6.6 mm.; length of posterior portion of pronotum 3 mm.; width of posterior portion of prothorax 3.3 mm. The median longitudinal length of pronotum is to the length of the rest of the body as 15 is to 40. The length of the respiratory appendages is distinctly greater than the length of the abdomen, but less than the length of the insect. The anterior femur is 12.6 mm. in length, slightly greater than lateral length of prothorax, the femoral tooth is situated 7.5 mm. from the base of the femur; no indication of a subapical sinuosity on tooth. Anterior coxa 8.3 mm. in length. Posterior femur 18.6 mm. in length being slightly less than the posterior tibia which is 20 mm. in length. The end of the posterior femora not reaching to margin of last abdominal segment. Posterior and intermediate tarsi subequal in length. Metasternum having its posterior margin prolonged into a metaxyphus which extends posteriorly between the metacoxae; metaxyphus raised to level of metacoxae and slightly arched posteriorly.

Distribution and types: Holotype male, allotype female and five male and one female paratypes from Tena, Ecuador, February 28, 1923 (F. X. Williams). All of the types are in the Francis Huntington Snow Entomological Collections.

Notes: This species is closely related to **R. hungerfordi** sp. n.

Ranatra curtafemorata sp. n.

Size: Length from tip of beak to tip of abdomen of male 36 mm.; respiratory appendages 21.5 mm.; length of female 39.5 mm.; of respiratory appendages 23 mm. Transverse width of head through eyes 3.1 mm.; greatest width of prothorax 3.3 mm.

Color: Hemelytra brown, straw yellow basally. Prothorax brownish, sternum yellowish; legs dark brown with yellowish mottlings.

Structural characteristics: Body moderately stout. Eyes large, transverse; transverse width about one-third greater than width of interocular space. Jugae prominent but not elevated as high as tylus; slightly divergent and rounded, not closely appressed to tylus, with a few bristles; tylus usually angles down sharply anteriorly making an obtuse angle. Vertex in many specimens is conoidal in shape. Antenna with lateral prolongation of penultimate segment as long as the ultimate segment. Prothorax moderately long and slender; the width of the anterior portion is distinctly less than transverse width of head through eyes. The length of the anterior portion is to the length of the rest of the body as 13.6 is to 36. Respiratory appendages always a little less than the length of the abdomen and rather stout.

Clasper without any indication of a subapical tooth. Fore femur 8.3 mm. long, femoral tooth small and a little nearer apex than the base, the tibia when closed on the femur does not reach to the femoral tooth, femur without apical tooth or sinuosity, moderately stout. Anterior femur shorter than length of pronotum measured on median dorsal line which is 8.7 mm. Anterior coxa 5.7 mm. long. Posterior femur 15.3 mm. long, posterior tibia 19.5

mm. long. Posterior tarsus slightly longer than the intermediate tarsus. Breast poorly developed. Metaxyphus not arched as high as the metacoxae and reaches slightly beyond middle of them. The female genital operculum very slightly arched and extends slightly beyond the tip of the abdomen under the base of the appendages. The posterior femora reaching to or slightly beyond middle of penultimate abdominal segment.

Types and distribution: Holotype male, allotype female, and 20 male and 11 female paratypes in the Francis Huntington Snow Entomological Collections. Holotypes and allotype from Rio Purus, Lago Berury Region, Brazil, S. A., Sept. 1, 1935, (A. M. Olalla). Also 14 male and 6 female paratypes with same label as types and 7 male and 5 female paratypes from Vic. Joao Pessoa (Sao Phelipe) River Jurna, Brazil, S. A., July 10 to Sept. 20, 1936 (A. M. Olalla).

Notes: The length of the anterior femur, shape of the vertex and tylus, and the small tooth on the mesal side of the clasper hook serve to distinguish this species. This species is the only known form having such a short anterior femur; it shows some relationships to **R. tuberculifrons** Mont.

Ranatra dolichodentata sp. n.

Size: Length from tip of beak to tip of abdomen of male 41.5 mm. to 44 mm.; respiratory appendages 21 mm. Width of head through eyes 3.5 mm.; greatest width of prothorax 4.1 mm.

Color: In general a light testaceous with the prothorax and meso- and metasterna much darker, almost rufous.

Structural characteristics: Body moderately stout and long. Eyes not transverse; width of interocular space slightly less than one and one-third times the transverse width of one eye. Jugae prominent and slightly divergent. Antenna with lateral prolongation of penultimate segment a little shorter than length of ultimate segment. Prothorax moderately heavy, the length of anterior portion measured on median dorsal line 6.5 mm.; length of posterior swollen part 2.9 mm., or median length of anterior part compared to length of posterior swollen part is as 10 is to 4.7. The length of pronotum is to the length of abdomen as 14½ is to 41. Width of anterior portion of pronotum slightly less than width of head through eyes. The respiratory filaments short, subequal to or slightly longer than half the length of the entire body in some specimens. Anterior femur 12.3 mm. long, anterior coxa 7.5 long; anterior femur without preapical tooth or sinuosity, very heavy and wide basally and gradually narrowing down toward the apex where it is narrowest, femoral tooth very prominent and long, slender and sharp. Anterior femur a little longer than lateral length of pronotum. Posterior femur 17 mm. long, posterior tibia 20.8 mm. Intermediate tarsus 3.5 mm. long, posterior margin of the ultimate abdominal segment in one specimen but reaching to or beyond anterior margin of last abdominal segment in others.

Distribution: Holotype and three male paratypes from S. Paulo, Ypirango, S. A., Brazil (R. Spitz collector). All types in the Francis Huntington Snow Entomological Collections.

Notes: This species, described from four male specimens, is close to **R. brevicauda** Mont. but differs in that it has a unique anterior femur that is widest at the base and gradually narrows out to the apex without any median constriction near the femoral tooth. This species is named for its very prominent, long and sharp femoral tooth. The appendages are about half the length of the entire body. The anterior tibia extends beyond the femoral tooth when folded back on the femur.

Ranatra hungerfordi sp. n.

Size: Male: Length from tip of beak to tip of abdomen 40 to 44 mm.; length of respiratory appendages 32 to 37 mm. Female: Length 42 to 47 mm.; length of respiratory appendages 32 to 39 mm.

Color: In general a testaceous color but varying to a dark brown color.

Shape: A broad sturdy species with prominent eyes.

Structural characteristics: Head not extending prominently in front of eyes. Eyes large, transverse, transverse width greater than width of interocular space by one-third. Width of head through eyes 3.8 mm. Jugae almost as prominent as tylus, slightly divergent, separated from tylus by a broad fissure. Median length of pronotum 10.4 mm.; width of anterior portion 2.8 mm.; width of posterior portion 4.1 mm.; length of anterior portion 6.8 mm.; length of posterior portion 3.6 mm. a little more than half the length of anterior portion. Length of pronotum is to the length of the rest of the body as 16.1 is to 43. Scutellum prominently convex on basal two-thirds; two prominent lateral declivities on posterior third. The respiratory appendages are fairly stout. Antenna large; penultimate segment with lateral prolongation subequal to the long ultimate segment. Anterior coxa 8.4 mm. in length a little less than two-thirds length of anterior femur which is 13.4 mm. Length from base of femur to base of femoral tooth 7.8 mm. Femoral tooth moderately long and stout. Anterior tibia 4.5 mm. in length and slightly arched. Anterior tarsus long and slender. The two lateral sulci on prosternum joining each other before reaching posterior margin and having a prominent median carina between them on the anterior half. Mesosternum prominently inflated and swollen. Posterior margin of metasternum developed into a long straight metaxyphus. Posterior femur sturdy, 21.5 mm. in length which is slightly greater than length of intermediate femur. Posterior tibia 27 mm. Posterior tarsus 3 mm. in length slightly greater than intermediate tarsus. Posterior femora reaching beyond anterior margin of last abdominal segment in the males and to the anterior margin in the females. The female operculum extends prominently beyond end of abdomen.

Data on Distribution: Holotype male and allotype female from Villarrica, Paraguay taken by Fran. Schade. Also 5 male and 9 female paratypes from the same locality taken by the same collector; 1 male and 2 female paratypes from Peru, S. A. taken by F. Woytkowski. All types are in the Francis Huntington Snow Entomological Collections.

Notes: This species is closely related to **R. brasiliensis** De Carlo.

Ranatra maculosa sp. n.

Size: Length of male from tip of beak to tip of abdomen 36 mm., length of respiratory appendages 20.5 to 24 mm., length of female 39 mm., of respiratory appendages 27.5 mm.

Color: A light brown to brown color with the legs a yellowish brown mottled with light brown.

Shape: A long, slender, narrow species with the transverse width through the eyes subequal to transverse width of posterior portion of pronotum and the posterior femora reaching the middle of the last abdominal segment.

Structural characteristics: The tylus and jugae not much advanced in front of eyes, the tylus slightly more advanced than jugae, the jugae slightly diverging and not closely appressed to tylus being separated by a shallow broad fissure. The transverse width of one eye greater than the width of interocular space. The vertex convex and elevated above the level of eyes when seen in lateral view. The anterior margin of pronotum appears doubly emarginate with the vertex inserted in the second emargination and the eyes in the first. The second emargination is broadly rounded and shallow. The anterior width of pronotum distinctly less than transverse width through eyes; the transverse width through eyes slightly less than posterior width of pronotum which is 3.2 mm. Median dorsal length of pronotum 9.2 mm.; portion anterior to transverse grooves 6.1 mm., portion posterior to transverse grooves 3.1 mm. Scutellum convex on basal two-thirds and having a transverse groove on posterior third. Abdomen long and narrow with sides parallel for two-thirds of their length. The lateral prolongation of penultimate antennal segment almost as long as ultimate segment. The two sulci on prosternum are prominent anteriorly but gradually fade out on posterior third. The anterior coxa is 7.1 mm. in length. The anterior femur is 10.5 mm. in length and equal to lateral length of prothorax; length from base of femur to base of femoral tooth 6.2 mm., of apical portion 4.3 mm. The anterior tibia does not reach to femoral tooth when folded against femur. The anterior tarsus blade-like and rather short. The mesosternum swollen and inflated. The mesocoxae more widely separated than the metacoxae. The intermediate femora extend to and slightly beyond false spiracles of penultimate abdominal segment; posterior femora reaching slightly beyond middle of last abdominal segment. The intermediate femur 16.5 mm. in length; the posterior femur 13 mm. In most of the specimens the posterior tarsus will extend to end of respiratory appendages when hind leg is extended posteriorly. The metaxyphus is narrow, straight and not raised to level of hind coxae, and extends posteriorly between metacoxae well beyond middle of coxae leaving a small portion of the first abdominal segment exposed. The genital clasper with a very prominent and sharp subapical tooth.

In the female the intermediate femora do not reach the false spiracles of the penultimate abdominal segment and the posterior femora do not quite reach to the anterior margin of the last abdominal segment. The

female genital operculum extends beyond the end of the genital segment by slightly more than one-fourth of its length.

Data on distribution: Holotype male, allotype female and 13 male and 9 female paratypes, all from Rio Grande, Br. Honduras, C. A., taken by J. J. White. All in the Francis Huntington Snow Entomological Collections. Also 3 males and 7 females from same locality taken by the same collector.

Notes: This species is closely related to **R. obscura Mont.** but differs in the length of the posterior femora and the distinct genital clasper.

Ranatra magna sp. n.

Size: Male: Length from tip of beak to tip of abdomen 46.5 to 53 mm., length of respiratory appendages 47.5 to 51.5 mm.; female 49 to 57.5 mm., respiratory appendages 48 to 55.55 mm. Transverse width of head through eyes 4.4 mm.; greatest width of prothorax 4.7 mm.

Color: Light brown, darker brown along anterior margin of hemelytra, prothorax and anterior femora. Much lighter mottling on anterior femora and coxae.

Shape: An elongate sturdy shape.

Structural characteristics: Eyes large, transverse; transverse width of one eye, one and one-half times width of interocular space. Jugae slightly divergent, prominent and with several bristles, not closely appressed to tylus, being separated from it by a prominent fissure, not elevated as high as tylus when seen in lateral view. Vertex convex, a transverse constriction between tylus and vertex. Prothorax moderately stout, long. Median length of pronotum 13 mm., length of anterior portion 9.1 mm.; posterior portion 3.9 mm. The greatest width of posterior portion of pronotum more than two times the width of narrowest part at middle of prothorax. The length of the prothorax is to the length of the rest of the body as 20.8 is to 53. Scutellum convex, plain on basal two-thirds, two lateral declivities on anterior part of posterior third. Respiratory appendages stout basally, a little shorter than length of the body. Anterior margin of pronotum broadly but not deeply emarginate with a transverse median elevation which is lightly depressed in its middle. Prosternum with two prominent sulci, separated by a prominent median carina on anterior half, these fading out beyond middle. Anterior coxa 11.4 mm. long. Anterior femur 17 mm. long, slightly longer than greatest lateral length of prothorax which is 16 mm.; 11.3 mm. from base to middle of femoral tooth; femoral tooth, usual size and shape; anterior femur without apical tooth or sinuosity and prominently constricted in region of femoral tooth. The anterior tibia when closed on the femur does not reach to the femoral tooth. Posterior femur 30 mm. long, posterior tibia 34 mm.; the posterior femora almost reaching end of last abdominal segment in males. Metaxyphus not arched nor as high as metacoxae. The female operculum extends under the appendages for about one-fourth of its length.

Data on distribution: Holotype male, allotype female and 5 male and 7 female paratypes from Manacapuru, Brazil (Manaos Amaz.) taken by

S. M. Klages. Also 8 male and 8 female paratypes from Rio Amazonas and Rio Purus regions Brazil, S. A. taken by A. M. Olalla and 4 males and 4 females from Sao Phelipe River taken by A. M. Olalla. All specimens in the Francis Huntington Snow Entomological Collections.

Notes: This species is closely related to **R. hungerfordi** sp. n. but differs from it by its much greater length and the distinct genital clasper.

Ranatra moderata sp. n.

Size: Length from tip of beak to tip of abdomen 39.5 mm., appendages 25.5 mm.; length of female 41 mm., appendages 24 mm., greatest width across thorax 4 mm.; transverse width of head through eyes 3.3 mm.

Color: Dark brown with yellowish mottlings on legs and light brown on head.

Structural characteristics: Body moderately stout. Width of head through eyes 2.9 mm. Eyes large, transverse, distinctly wider than interocular space, width of one eye one and one-third times width of interocular space. Jugae divergent and prominent, not elevated as high as tylus and with few bristles on lateral margin. The tylus usually dropping away abruptly anteriorly so as to form an obtuse angle rather than a curve. Prothorax moderately heavy; the width of the posterior portion equal to the transverse width of head through eyes. The length of the anterior portion is to the length of the posterior enlarged portion as 9 is to 5 measured on dorsal median line. The length of the prothorax is to the length of the rest of the body as 14 is to 40. Respiratory appendages rather stout and a little longer than half the length of the body. Antenna with lateral prolongation of penultimate segment about as long as ultimate segment. Anterior femora slightly more than 10 mm. long, rather stout, without apical tooth or sinuosity, the femoral tooth small, stout and blunt. The tibia when closed on the femur does not reach to the femoral tooth. The length of the apical portion of anterior femur from apex to the middle of tooth is 4.3 mm. and of the basal portion 6 mm. The length of the anterior femur is slightly greater than the lateral length of the thorax. The posterior femur is 17.3 mm. long and just reaches the anterior margin of the last abdominal segment. The metaxyphus narrow and slightly elevated but not reaching the level of the metacoxae it does not cover the entire first abdominal segment. The female operculum extends 1/9 of its length beyond the tip of the abdomen under the respiratory appendages.

Data on distribution: Holotype male and allotype female and 16 male and 17 female paratypes from Rio Purus Region, Brazil S. A., taken by A. M. Olalla. Also 31 males and 11 females from Vic. Santo Antonio River Brazil, taken by A. M. Olalla; 29 males, 28 females from Vic. Joao Pessoa (Sao Phelipe) taken by A. M. Olalla.

All specimens in the Francis Huntington Snow Entomological Collections.

Notes: This species is close to **R. obscura** Mont. but differs by the absence of a subapical tooth on the genital clasper.

Ranatra operculata sp. n.

Size: Length from tip of beak to tip of abdomen of male, 32.5 mm., of female 39 mm.; apendages of male 17.5 mm., of female 19.5 to 22.5 mm. Width of head through eyes, 2.5 mm. Width of thorax 2.8 mm.

Color: Generally testaceous with darker mottlings on the legs and dorsally, prosternum and anterior coxae brownish.

Structural characteristics: Body slender and moderately elongate. Width of interocular space almost one and one-third times the width of eye. Jugae extending prominently in front of eyes; slightly divergent, not reaching level of tylus. Prothorax slender, median length 8.1 mm., width of anterior portion less than transverse width of the head through eyes; the length of the anterior portion to the length of the posterior swollen portion is as 8 is to 4, width of posterior portion 2.8 mm. Length of prothorax to abdomen is as 12 is to 33. Respiratory appendages rather short being greater than half the length of abdomen but distinctly less than length. Antenna with lateral prolongation of penultimate segment smaller and shorter than ultimate segment; sometimes about half the length of ultimate segment. Anterior femur rather stout, 9 mm. long; femoral tooth sharp, slight sinuosity preapically; tibia when folded back on femur does not reach to femoral tooth. Anterior coxa 6 mm. long, two-thirds length of femur. Mesocoxae proximal, as close together as metacoxa. Posterior femur 14 mm., tibia 17 mm. Intermediate femur 13.2. Posterior femora not reaching to anterior margin of last abdominal segment. Posterior and intermediate tarsi subequal. Metaxyphus with needle-like ending leaving part of the first abdominal segment exposed.

Data on distribution: Holotype male, allotype female and 7 male and 11 paratypes in the Francis Huntington Snow Entomological Collections. The holotype and allotype from Zacapu, Michoacan, Mexico, taken by H. D. Thomas. The paratypes from the following localities:

Mexico: Jalisco, taken by H. D. Thomas, 4 males, 2 females; Zacapu, taken by H. D. Thomas, 2 females; Chiapas, taken by H. D. Thomas, 1 male, 2 females; Tejupilco, taken by H. E. Hinton, 3 males, 2 females; Tejupilco, taken by R. L. Usinger, 1 female; Nueva Leon, taken by Creaser-Gordon, 1 female.

Notes: This species resembles **R. nigra** H. S. The operculum of the female extends one-third of its length beyond the base of the respiratory appendages. The anterior femora are not as long and slender and the antenna has the lateral prolongation of the penultimate segment longer than in **R. nigra** H. S. Also set off by the genital claspers. The jugae are more prominent in this species than in **R. nigra** H. S. The connexiva show some widening on posterior half in some specimens.

Ranatra parvula sp. n.

Size: Length from tip of beak to tip of abdomen of male 25.5 to 27 mm., appendages 27 to 29 mm.; of female 29 to 32.5 mm. long, appendages 31 to 34.5 mm. Transverse width of head through eyes 2.1 mm.

Color: General color a light brown. Prothorax darker both ventrally and dorsally and hemelytra darker than body.

Shape: Body slender.

Structural characteristics: Eyes transverse, transverse width of one eye slightly greater than width of interocular space. Jugae prominent, extending prominently in front of anterior margin of eyes, nearly reaching level of tylus. Jugae not closely appressed to tylus being separated from tylus by a prominent wide fissure. Prothorax slender, the width of the posterior portion 2.2 mm., slightly greater than the transverse width of head through eyes, the length of the anterior portion is to the length of the posterior swollen part as 6.6 is to 3.2 measured on the dorsal median line. The length of the prothorax is to the rest of the body as 9.8 is to 25 measured on dorsal median line. Scutellum slightly raised on basal two-thirds and having two light lateral depressions just anterior to posterior third. Respiratory appendages slender and about equal to or slightly longer than the length of the body. Genital clasper with a sharp anteapical tooth about half as long as the apical one. Antenna with lateral prolongation of penultimate segment smaller and shorter than the ultimate segment. Anterior femur 8.5 mm. long, slightly longer than prothorax measured along lateral line; femoral tooth small and blunt, situated closer to apex than base, no preapical tooth or sinuosity. Anterior coxae 5.6 mm. long. Posterior femur 12.3 mm. long, posterior tibia 16 mm. long. Posterior and intermediate tarsi subequal in length (without claws).

Data on Distribution: Holotype male, allotype female and 23 male and 16 female paratypes from Canacapuru, Brazil, S. A. taken by S. M. Klages in the Francis Huntington Snow Entomological Collections. Also 61 males and 77 females bearing the same label.

Notes: This is one of the smallest new world species. Prosternum having the lateral longitudinal sulci rather indistinct on posterior half. Mesocoxae proximal, as close together as metacoxae. The metasternum not having the posterior margin produced into a metaxyphus which extends posteriorly between metacoxae. The female operculum not extending beyond posterior margin of abdomen. This species is close to **R. rabida** White but differs from it by the shape of the metasternum and the genital clasper.

Ranatra spatulata sp. n.

Size: Male: Length from tip of beak to tip of abdomen 37 mm.; length of respiratory appendages 43.5 mm.; width of posterior portion of pronotum 3.8 mm.

Color: This specimen is yellowish brown; with head, anterior portion of pronotum, median portion of mesosternum, lateral portion of abdominal sternites and apical portions of intermediate and posterior femora a dark brown.

Shape: A rather slender species with posterior portion of prothorax broad and pronotum prominently contracted at middle, hemelytra short only reaching to middle of penultimate abdominal segment, abdomen ending in a point, long slender respiratory appendages and long thin posterior

femora which almost reach the posterior end of the last abdominal segment.

Structural characteristics: The eyes are prominent, globular, almost spherical and one-third wider than the width of the interocular space, black with three light brownish transverse wavy lines and a narrow band of the same color on median margin of eye. Jugae prominent, raised above level of tylus posteriorly, slightly divergent and having a few scattered hairs, a rather prominent fissure separating jugae from anterior mesal margin of eyes. Vertex convex, not extending appreciably beyond posterior margin of eyes. Anterior portion of pronotum slender, transverse width a little greater than half the width of posterior part; anterior portion a light brown color while posterior portion is nearly yellow; median length of anterior portion is a little less than twice the median length of posterior part (9.2 to 5.2). The transverse grooves slightly visible, almost indistinct. Anterior margin of pronotum an angular shape, weakly emarginate; posterior margin broadly but not deeply emarginate. Scutellum a little longer than wide at base, basal two-thirds convex and raised, a prominent transverse depression just before posterior third, apex ending in acute-angled point. Antenna with lateral prolongation of penultimate segment short and stout. Anterior coxa 8.6 mm. in length. Anterior femur 13.3 mm. in length which is distinctly greater than lateral length of prothorax. Length from base of femoral tooth to base of femur, 7.8 mm. Femoral tooth long and sharp. Anterior tibia when folded against femur reaches beyond anterior margin of tooth. Anterior tarsus long and narrow. Prosternum having a prominent median carina on anterior three-fourths; lateral sulci very shallow except on anterior fourth. Posterior portion of prosternum and mesosternum prominently swollen and inflated. Mesosternum with posterior margin angular in shape. Metasternum a lozenge shape with median ventral flattened area in shape of a spatula; the posterior margin is not prolonged into a metaxyphus leaving most of first abdominal segment exposed. The mesocoxae more widely separated than metacoxae. Length of intermediate femur 17 mm.; posterior femur 18.5 mm. The posterior femora almost reaching end of last abdominal segment. Intermediate and posterior tarsi subequal. The operculum has a prominent median ventral keel.

Distribution: Male holotype from Key West, Florida, May 8, 1919 in the Frank Lutz Collections, American Museum of Natural History.

Notes: The shape of the eyes, the short hemelytra, the shape of the metasternum and the genital clasper are distinct from all other known American **Ranatra**.

Ranatra williamsi sp. n.

Size: Length from tip of beak to tip of abdomen of male 29 to 32 mm., length of respiratory appendages 28 mm.; length of female 31 to 33 mm., length of respiratory appendages 28 to 29 mm. Greatest width of pronotum 3.1 mm.

Color: In general a light brown color with the anterior portion of pronotum and prosternum dark brown to black.

Shape: Body slender to moderately stout.

Structural characteristics: Width of head through eyes 3 mm., eyes globular and transverse, width of one eye one and one-third times width of interocular space. Jugae and tylus not projecting prominently in front of eyes, jugae divergent, not closly appressed to tylus, tylus more elevated than jugae. Vertex convex and elevated to level of eyes when seen from the side. Anterior margin of pronotum broadly rounded, posterior margin broadly and deeply rounded. Median length of pronotum 8 mm.; length of anterior portion two times length of posterior portion. Prothorax narrow in middle region. The length of the prothorax is to the length of the rest of the body as 11½ is to 29½. Scutellum convex on basal two-thirds, plain; two lateral declivities on posterior third. Antenna with lateral prolongation of penultimate segment cylindrical and almost extending the length of the ultimate segment. Anterior coxa 6.5 mm. long; two-thirds length of anterior femur which is 9.7 mm.; anterior femur without subapical tooth or sinuosity, femoral tooth moderately long and stout. Anterior femur constricted in region of femoral tooth. The anterior tibia does not reach to anterior margin of femoral tooth when folded on femur. Prosternum with prominent carina on anterior portion bordered by prominent longitudinal sulci which diminish on posterior portion; the sulci joining just before the posterior margin. Mesosternum somewhat inflated and swollen. Mesocoxae more widely separated than metacoxae. Metaxyphus long and narrow, slightly arched posteriorly. Length of posterior femur 14 mm., length of posterior tibia 16.7 mm., posterior tarsus without claws 2.3 mm. Length of intermediate femur 14.4 mm., intermediate tibia 15.2 mm., intermediate tarsus 2.4 mm. The female operculum extends slightly beyond end of body.

Data on distribution: Holotype male, British Guiana, South America, taken by F. X. Williams for whom I name this species. Allotype female, 5 male and 3 female paratypes, Botanic Gardens, Georgetown, British Guiana, S. Harris; 1 male paratype, New Amsterdam, British Guiana, F. X. Williams. At hand 2 males and 3 females, Demerera, British Guiana, S. Harris. Types and paratypes in the Snow Entomological Collections.

Notes: This species is closely related to **R. obscura** Mont. but is readily distinguished from it by its unique genital clasper.

A NEW TENAGOBIA FROM PERU (Hemiptera, Corixidae)

By ADDIE EGBERT*

Tenagobia peruiana n. sp.

Size: Length 2.8 mm. to 2.9 mm. Width across eyes 1.05 mm. to 1.13 mm.

Color: Yellowish to brownish fuscous above, sometimes uniformly colored but more usually marbled with alternate longitudinal striations of light and dark color. Outer margin of hemelytra with a dark brown maculation at level of tip of the embolar groove. Vertex, face, legs and thoracic venter yellowish to greyish white; abdominal venter pale in females, slightly infuscated in males.

Structural characteristics: Interocular space slightly broader than the posterior width of an eye; vertex and frons rounded in both sexes; postocular space, at center, about four times the width of an eye facet. Pronotal disk tapered laterally, not truncate in front of bases of hemelytra; disk at middle line one half as long as scutellum; scutellum length to width :: 2 : 3. Basal portion of clavus appearing minutely punctate; rest of clavus and corium beset with minute, peg-like setae, visible under high power; membrane covered with long, silky, pale hairs.

Nodal furrow not apparent in lateral margin of hemelytron. Embolar groove minutely punctate. Claval pruinose area very short. Lateral lobe of prothorax with a mustache-like tuft of hairs on outer distal angle; lateral margin of metaepimeron fringed with long, hair-like setae. Metaxyphus much broader than long.

Front leg of male—pala and tibia of almost equal length, the latter bearing two stout spine-like setae on the lower margin; inner base of femur bearing four short spine-like setae. Middle and hind legs long and relatively slender. Proportions of segments as follows—Middle leg—femur : tibia : tarsus : claws :: 100 : 28.1 : 41.6 : 29.1. Hind leg—femur : tibia : tarsus 1 : tarsus 2 :: 100 : 71.8 : 75.6 : 47.3 : 18.9. Male asymmetry dextral; left anal lobe and genital claspers as shown in text figure.

Comparative notes: Although differing in some respects, this new species seems most closely allied to Deay's **hungerfordi** group, containing **T. hungerfordi** Deay, **T. melini** Lundbl., **T. schadei** Lundbl., and **T. fuscata** (Stal)[1]. Unlike any of them, however, it bears only 4 spine-like setae on the inner base of the front femur, whereas the rest of the group bear from five to nine such setae. The left clasper of the male bears the stiff, brown projection characteristic of this group, but closer to the dorsal surface than in the others. The pegs on the front femur and the shape of the male claspers will serve to distinguish this species from the rest of the group.

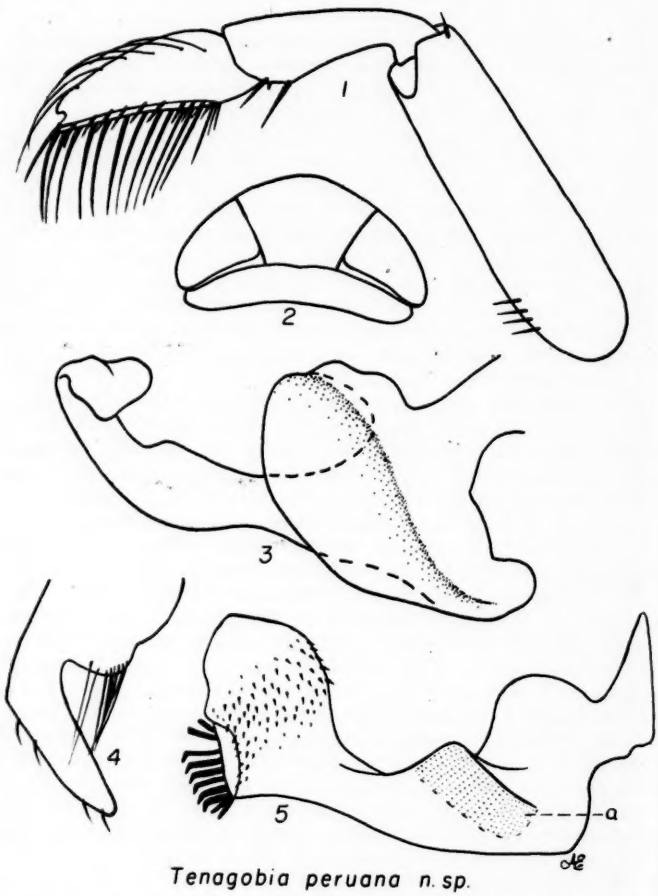
Location of types: Holotype ♂, allotype ♀, and 10 ♂ ♂ and 12 ♀ ♀ paratypes labeled "Roqueron del Padre, abad Cordillera, Agui Dept., Loreto, Peru, Aug. 3, 1946, F. Woytkowski," in the Snow Entomological Collections, University of Kansas.

Data on distribution: Loreto, Peru.

---

* Contribution from the Department of Entomology, University of Kansas.

[1] 1935. Deay, Howard. Univ. of Kans. Sci. Bull. XXII, No. 14, pp. 419, 421.



Text fig. 1. **Tenagobia peruana** n. sp. (1) Front leg of ♂; (2) dorsal view of head and pronotal disk of ♂; (3) right clasper; (4) dorsal view of left anal lobe of ♂; (5) inner view of right clasper; (5a) the brown projection of the right clasper mentioned under comparative notes.

PREDACIOUS HEMIPTERA FEEDING OBSERVATIONS

GEORGE F. KNOWLTON
Utah State Agricultural College
Logan

While on a trip to the Uintah Basin in northeastern Utah, a stop was made near Myton, on August 24, 1948, to observe the abundance and activity of honeybees and wild bees coming to blossoming alfalfa, white sweet clover and sunflowers. The phymatid bug, **Phymata pennsylvanica coloradensis** Melin., was observed to be even more numerous on blossoming sunflower "heads" than **Lygus elisus** Van D., **L. hesperus** Knight or other mirid bugs. Many of the ambush bugs were mating. Seldom was a sunflower found which was in full bloom without from two to five of these predatory bugs resting on it. One female **P. p. coloradensis** of a mating pair was observed to have killed and to be feeding on a fly, **Musca sp.** On a nearby blossoming sunflower head, a second female **coloradensis** was feeding on a freshly dead wild bee which Dr. G. E. Bohart identified as a male **Dufourea marginata** Cresson.

At Phoenix, Arizona, on May 5, 1945, the writer observed a **Nabis alternatus** Parsh. to be feeding on an apterous **Macrosiphum solanifolii** Ashm. aphid, on a rose bush in a home garden. On October 3, 1942, a **N. alternatus** was observed feeding on a winged common willow psyllid, **Trioza maura** Forster, at Riverdale, Utah. A female **alternatus** was observed while feeding on a second-instar pea aphid, **Macrosiphum pisi** (Kalt.), on alfalfa at Pleasant Grove, Utah, April 17, 1943. This damsel bug predator usually becomes very common in alfalfa fields throughout Utah later in the season and is commonly attracted to lights. At St. George, Utah, an **alternatus** was observed to be feeding on an **Empoasca** sp. leafhopper, beneath lights in front of the dark red-brick postoffice, on the evening of July 8, 1943. A similar observation was made at Snowville, Utah, August 26, 1944, when an **Empoosca** sp. again was the prey, being fed upon beneath the porch light on a white painted wall. Examination of aphid infested sagebrush, **Artemisia tridentata typicus,** near Enterprise, Utah, July 16, 1947, revealed a **Nabis alternatus** to be feeding on a wingless **Pseudoepameibaphis glauca** G.-P. This seemed a rather small prey for this damsel bug predator. Also, at Naples, Utah, on July 25, 1945, a mature **Anthocoris melanocerus** Reuter was found while feeding on a specimen of this same little aphid, which was abundant on **Artemisia tridentata.** An examination of an alfalfa field, six miles southwest of Fillmore, Utah, May 30, 1945, revealed a **Nabis alternatus** to be feeding on a second instar alfalfa weevil, **Phytonomus posticus** (Gyll.). A moderate infestation of this weevil existed in the field at the time.

Three **Nabis alternatus** adults and 5 **Dikraneura carneola** (Stal.) leafhoppers, plus 14 small tachinid flies and miscellaneous flies and midges were collected in 20 sweeps of the insect net in 8 to 10 inch tall dryfarm wheat, in the Garfield area of Salt Lake County, Utah, May 5, 1948. Scarcely had the three **Nabis** been placed in a 2 dram shell vial, with the leafhoppers, than a male **alternatus** attacked another of the same species and they struggled, rolled over each other soon getting into a "ball" which included the

third **Nabis** female. One male continued to feed on its "rival" until each **Nabis** was caged in a separate vial. Separation was made in an effort to save them from killing each other. Within three minutes after being separated, the apparently unhurt female had captured and was feeding on a **D. carneola**, which was caged with her in the vial. Ten minutes later the same **alternatus** was feeding on and soon had killed a midge, which also was present in the vial.

The green peach aphid, **Myzus persicae** (Sulzer), was injuriously abundant on seed beets at St. George, Utah, May 18, 1944. An adult **Nabis alternatus** was observed to be feeding on one of the wingless aphids. Ladybird and other predators of aphids were common in this field. Near Bear River City, Utah, an **alternatus** was observed to be feeding on a third instar **Macrosiphum ambrosiae** (Thomas) aphid, August 30, 1945. Adult lygus bugs were extremely abundant in a celery field at American Fork, Utah, on August 2, 1946. Most of these evidently had moved in recently, since the nearby fields of alfalfa were cut. Mr. Ed. Davies called the writer's attention to a **N. alternatus** which was feeding on a winged **Lygus elisus.** Further search showed another mature female **alternatus** to have captured and to be in the process of feeding on a **L. hesperus** adult. Six-spotted leafhoppers also were especially numerous in this celery field; one of these was found to have been attacked by a mature male **alternatus.** While examing aphid-infested corn at Holladay, Utah, on August 3, 1946, an **alternatus** was found to be feeding on an apterous **Aphis maidis** (Fitch) on a corn leaf. Adult and nymphal **Orius tristicolor** (White) also were present among these aphids. At Moab, Utah, pea aphids were destroying several fields of alfalfa on April 8, 1947. One **M. pisi** was found while being fed on by an **alternatus.**

While studying pea aphid populations in a heavily infested pea field at Amalga, Utah, June 27, 1938, a **Nabis ferus** L. was observed to be feeding on a mature wingless **Macrosiphum pisi** (Kalt.). Other aphid predators also were abundant in this field. A **ferus** adult female was found to be feeding on a small alfalfa weevil larva in an alfalfa field at Hurricane, Utah, on May 5, 1943. Nearby in this field a third-instar **Nabis** nymph was feeding on a half-grown pea aphid. At Spangle, Washington, a **N. ferus** was feeding on a **Macrosiphum** sp. aphid on goldenrod, August 10, 1944. At Fort Lewis, Washington, a **ferus** was found while feeding on a small aphid, **Eulachnus rileyi** (Wms.) on yellow pine, August 20, 1944. At Springville, Utah, a **ferus** was feeding on **Aphis rumicis** L. on a heavily infested snowball bush, June 12, 1945. A study of insect conditions in an alfalfa field at La Point, Utah, July 25, 1945, revealed numerous pea aphid predators to be present. On careful study, a **N. ferus** and also a **Geocoris atricolor** Montd. was found while feeding on **Macrosiphum pisi.** Numerous **Nabis alternatus, Orius tristicolor,** syrphid larvae, **Collops bipunctatus,** ladybird beetles, adult and fewer larval aphid lions also were present.

Nabis roseipennis Reut. was feeding on a whitish, wingless **Macrosiphum solanifolii** Ashm. on **Rudbeckia,** at Mt. Timpanogos, Utah, July 26, 1942. This aphid has been observed in abundance also at Mink Creek and in Emigra-

tion Canyon, Idaho; at Mt. Nebo and Monte Cristo in Utah. At Brigham City, Utah, a **N. roseipennis** was found while feeding on a **Myzocallis tiliae** (L.) aphid on linden leaf, June 21, 1943. In Mill Hollow of Logan Canyon, Utah, a **roseipennis** was found to be feeding on one of the numerous **Eucer-aphis gillettei** Dav. on leaves of **Betula fontinalis**, near the public camp ground. Several nymphal **N. roseipennis** were collected on aphid infested **Rudbeckia** plants near "Devil's Kitchen" on the Mt. Nebo Scenic Loop, in Utah, August 14, 1943. When these second and third instar damsel bug nymphs were placed on the writer's hand, they wandered about. One walked to the lower side of the hand and "fed" at the base of the "little finger" for twelve seconds, at which time the nymph was disturbed. The feeding process caused irritation, and the area "burned" for about ten minutes. At Zion National Monument, a **roseipennis** was found to be feeding on a green adult boxelder psyllid, on May 18, 1944. In Logan Canyon, on maple, a **roseipennis** was found while feeding on a pale, oviparous **Drepanaphis granovskii** S.-K., on October 8, 1944.

APHIDS ON UMBELLIFERAE

GEORGE F. KNOWLTON
Utah Agricultural Experiment Station
Logan

Virus diseases of celery resulted in very serious financial losses to commercial celery growers of Utah during the season of 1946. Less extensive injury occurred during 1947. Celery from a number of affected fields was sent to Drs. J. H. Freitag and D. D. Jensen,[1] who found western celery mosaic to be present in all celery plants tested.

Preliminary studies have shown aphids to occur rather commonly on most umbelliferous plants so far examined in Utah. Often the aphids were found to be present in great abundance. The writer is indebted to Professor M. A. Palmer[2] for her identifications of most of the material here recorded.

Aphis helianthi Monell, on celery, **Apium graveolens**, at Bozeman, Montana, August 18, 1926 (C. B. Philip), and at American Fork, Utah, August 4, 1947 (G. F. Knowlton-T. C. Yao).

A. helichrysi Kalt., on celery at Riverton, Utah, June 13, 1947 (Knowlton), American Fork, Utah, June 14, 1947 (Knowlton-M. Varzandeh). Also taken on celery at Bear River City, Utah, July 7, 1947 (H. E. Dorst, Det. L. M. Russell).

A. heraclella Davis, on celery at Bear River City, Utah, July 7, 1947. Collected on water hemlock in Box Elder Canyon, Utah, July 12, 1947 (Knowlton), and Murray, Utah, June 30, 1947 (Knowlton-T. Tibbetts). Heavily infesting wild parsnips at Waterton National Park, Alberta, Canada, July 24, 1946 (Knowlton) and nearby Red Rocks Canyon, Waterton National Park

[1] Entomologists of University of California at Berkeley.
[2] Entomologist of Colorado A. & M. College at Fort Collins.

(G. F. Spencer, and Knowlton); wild carrot, **Daucus carota,** Slaterville, Utah, July 19, 1947 (Knowlton); wild parsnip, **Pastinaca sativa,** Provo, Utah, May 10, 1947 (Knowlton) and Lake McDonald, Glacier National Park, Montana, July 28, 1946 (Knowlton). Damaging celery at Brigham City and Deweyville, Utah, August 5, 1943 (Knowlton-D. R. Maddock-P. E. Telford), and at American Fork, Utah, during 1946 (Knowlton).

A. middletonii Thomas, on **Pastinaca sativa,** Deweyville, Utah, June 4, 1947 (Knowlton).

A. rumicis L., on wild carrot, **Daucus carota,** Slaterville, Utah, July 19, 1947 (Knowlton).

Cavariella aegopodii Scop. was abundant on celery at American Fork and Springville, Utah, June 14, 1947 (Knowlton); celery at Bozeman, Montana, August 18, 1946 (C. B. Philip); damaging carrot foliage, North Logan, Utah, April 21, 1947 (F. E. Todd-W. P. Nye); Logan, August 3, 1947 (Knowlton). On dill, Logan, July 27, 1938 (Knowlton-G. S. Stains) and Moscow, Idaho, July 9, 1941 (T. A. Brindley); **Pastinaca sativa,** Farmington, Utah, May 29, 1947 (Knowlton).

C. essigi (Gill.) on **Heracleum lanatum,** Defaures Deception Pass, Washington, June 10, 1934 (W. W. Baker); Auberfean, Washington, August 6, 1937 (H. C. Bennion); Death camas, Multonah Falls, Oregon, June 20, 1939 (Knowlton); **Pastinaca sativa,** Lake McDonald, Glacier National Park, Montana, July 28, 1946 (Knowlton); **Heracleum lanatum,** Spring Hollow of Logan Canyon, Utah, June 19, 1938 (Knowlton-Nye).

C. pustula Essig was abundant on celery west of American Fork, Utah, June 14, 1947 (Knowlton-M. Varzandeh).

C. theobaldi (Gill.) on celery, Bozeman, Montana, August 18, 1926 (C. B. Philip).

Rhopalosiphum melliferum (Hottes) on **Cicuta occidentalis,** Smithfield, Utah, September 10, 1926 and Logan, August 18, 1925 (Knowlton); wild carrot, **Daucus carota,** Slaterville, Utah, July 19, 1947 (Knowlton).

Myzus persicae (Sulzer) on celery, Midvale, Utah, July 8, 1947 (H. E. Dorst).

Macrosiphum sp. nymphs, on celery, Corinne, Utah, July 7, 1947 (H. E. Dorst, Det. L. M. Russell).

PRICE OF BACK VOLUMES

Back Volumes $2.50 per volume

Subscriptions for back volumes or numbers should be sent to Donald A. Wilbur, Department of Entomology, Kansas State College, Manhattan, Kansas.

CONTENTS OF THIS NUMBER

A Study of the Genus Martarega
(Hemiptera, Notonectidae)
FRED S. TRUXAL 1

Some New Ranatra from the Americas
LOUIS C. KUITERT 24

A New Tenagobia from Peru
(Hemiptera, Corixidae)
ADDIE EGBERT 35

Predacious Hemiptera Feeding Observations
GEORGE F. KNOWLTON 37

Aphids on Umbelliferae
GEORGE F. KNOWLTON 39